Internet Civil Defense:

Feasibility Study

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Management Summary

Internet Civil Defense (ICD) is designed to substantially enhance national preparedness and response to both terrorism and natural disasters. ICD is a national (and ultimately, international) system of information sharing, education and analysis via the Internet to connect the general public, community networks, emergency responders, local and national investigative authorities, and scientific experts and public health officials around the globe in real time for the common purpose of increasing public safety, security, and resilience.

ICD will enable multiple neighborhoods, practitioners, and the emergency community overall to become more effective by mobilizing millions of "eyes" to help rapidly detect and mitigate both terrorist acts and natural disasters. That information will be shared rapidly via the Internet to create "neighborhood visibility" and thereby enable coordinated, proactive response to emergencies.

The ICD System is being designed for three main purposes: (1) Effective mitigation of disasters through rapid, informed response; (2) Fear Management – by supplying the public with customized, accurate, timely, and knowledgeable information; and (3) ultimately, deterrence of terrorism through heightened follow-up of identified threats. **ICD will provide actionable information to enhance public safety and homeland security**.

For example, first responders will benefit from direct input from on-the-ground observers, connected via the ICD Network, to make them simultaneously more productive and safer. Scientists and medical experts from around the globe will rapidly contribute their expertise to speed diagnosis and design effective treatments. The public will receive accurate and timely information to minimize rumors and accelerate recovery from disasters. ICD will create an "umbrella" framework to raise the overall effectiveness of national Emergency Management (EM).

The tragic events of 9/11 exposed the vulnerability of our national system of homeland defense. The New York City Partnership and the city Budget Department now estimate that the direct and indirect costs of 9/11 exceed $90B, including over $40B in direct insured losses. ICD is being designed to fill in key gaps in EM practice and coordination, while leveraging the strengths of the current system. Major gaps to fill have been highlighted in the recent Markle Report, plus other analyses, and include: Weak information sharing and integration; Low public involvement and engagement; and Excessive delays in emergency response. Proactive fear management via education is another key need that will be addressed by ICD.

The ICD design consists of three components: **Neighborhood Network Building** to mobilize community networks to substantially enhance neighborhood-level visibility, and to inform and educate the public via the ICD Public Portal; **Information Fusion Centers** to synthesize and direct information; and a **Mitigation Operations Center** to facilitate safer, faster, and more productive emergency response.

Neighborhood Network Building will create multiple Neighbor-to-Neighbor (N2N) trusted networks, linked via the Internet, that increase community cohesiveness and provide On-the-Ground Observer volunteers to support and inform mitigation operations. ICD will partner with existing organizations such as American Red Cross (ARC), Neighborhood Watch and Citizen Corps to aggressively build up a national network of citizens who promote family-level and community-level preparedness and participation.

The Public Portal will be the primary ICD contact point with the public and with the N2N networks. The Portal will provide a comprehensive "Referral Guide" to Emergency Management-related sources to help the public report observations and/or anomalies to the responsible public authorities.

The Public Portal will aspire to be a "Highly-Recognized Source of Trusted Knowledge on Disaster Preparedness and Emergency Management." To achieve this, the Portal will deliver a variety of relevant and practical content, that is aggregated from multiple authoritative sources, plus ICD-originated content. An ICD Board of Scientific Advisors will help to "vet" this content to ensure accuracy and timeliness. The Portal will also feature content such as live webcasts on topical issues surrounding terrorism and emergency management, to engage the public and help create an involved, vigilant society.

The **Information Fusion Center** (IFC) will collect and integrate multiple inputs to speed detection of potential terrorist events and other threats. IFC will help to "connect the dots" to identify problems early on – such as spread of disease, or multiple affected water supplies that could be a sign of bio-terrorism. IFC will incorporate more sophisticated interpretive technologies over time to support its mission of early and incisive pattern detection and alerts.

The **Mitigation Operations Center** (MOC) will provide tools and information to coordinate rapid response and mitigation. One example of a key tool is a database that enables the first responders and various community organizations, including ARC, to "pool" their resources – including food, shelters, and equipment – and obtain a global view of a disaster situation. That database would be visible by all response agencies to leverage mutual productivities. The MOC will also manage the On-the-Ground Volunteer Network, mobilized through the ICD Public Portal, to provide real-time status information on developing crises. For example, the On-the-Ground Volunteers can provide "ground truth," such as the extent of hurricane or fire damage, to inform mitigation operations. Similarly, a confirmed threat can be broadcast to the ICD network – and even trigger targeted alerts to specific, adjacent neighborhoods – to activate support from millions of On-the-Ground Volunteers and Coordinators. Just-in-time information from a Global Experts Network maintained by ICD can also provide critical operating guides – such as how to put out a particular type of chemical fire, or how to operate safely in 1000º temperatures. ICD users will also be easily able to create network "Locator directories" of "friends and family" that will help them all to stay in touch and communicate in the midst of any crisis.

Over time, ICD could provide the "backbone" for an enhanced system of national emergency preparedness and response. For example, today, the nation has multiple "input" systems that provide valuable status alerts. These include the FEMA NAWAS system, Meteorological sensors, CDC Health statistics, and public and investigative inputs. Likewise, there are multiple "output" and communication systems, including the FEMA MERS system and new programs to enhance mobile communications for the first responders. ICD could tie together these systems to deliver a range of benefits:

- Use the inputs to help drive better and earlier detection for mitigation operations;
- Connect both the inputs and outputs to the Internet, combined with strengthened neighborhood-level networks;
- In turn, connect these to the Information Fusion Center, to the Global Experts Network, and to the On-the-Ground Observers;
- Provide fast and effective links to public education and to local alert systems.

To achieve "critical mass," ICD will target to engage approximately 2M active "users" within two years as "eyes, ears, and brains" of ICD acting within community networks; plus around 40,000 On-the-Ground Coordinators, who would also help to mobilize their communities. Over time, ICD participation should grow to over 5M national "eyes" supporting mitigation and preparedness. ICD recruiting will involve mixed channels of: public relations; grass roots recruiting in PTAs, professional associations like National Association of Emergency Managers (NEMA), and diverse communities; spread via word of mouth; plus, on-line recruiting. ICD recruiting will be closely coordinated with partner organizations such as ARC, Neighborhood Watch, and Citizen Corps.

ICD Implementation Workshops have identified potential partnership between DHS/FEMA and ARC as currently the most attractive vehicle to "host" ICD. ARC brings high public credibility and valuable skills in public education and emergency response to a potential partnership. In turn, ICD participation can help further elevate ARC's stature and skills as an important national and local player in Emergency Management. Similarly, FEMA brings to the partnerships significant skills in training and response, plus reputation as EM leader and coordinator for the Nation. The ICD activities can contribute significantly to the new mission of DHS, as defined by the President, to serve both as (1) focal point for emergency communications with the public, and (2) the core of "a unit whose sole mission is to assemble, fuse, and analyze relevant intelligence data from government sources and data gleaned from other organizations and public sources. With this big-picture view, the Department would be more likely to spot trends and would be able to direct resources at a moment's notice to help thwart a terrorist attack."

What are the economics and benefits of ICD? Our analysis, detailed in the ICD Financial Plan, indicates that ICD could be launched for less than $25M in up-front capital and for an annual operating budget of $85M/yr. to support 2-4M users. Of this amount, more than 50% represents activities (such as Information Sharing and Information Fusion across agencies) that are "core" to the new mission of the Department of Homeland Security (DHS). Integrating those activities with the network building, education, and

mitigation-support focus of ICD can create the greatest benefit for the nation at the lowest cost, by designing an “end-to-end” national Emergency Management system up front.

A 1% one-time reduction of a major terrorist threat like 9/11 would justify national expenditure on ICD on a permanent basis. Similarly, 1% more effective mitigation of the estimated $20B/yr. in cost of natural disasters to the U.S. would cost justify ICD at least three-fold. Beyond the “hard” economic benefits, our society would benefit from more cohesive and resilient communities; less fear and spread of fear; and a public education network that helps tap and diffuse JIT actionable global knowledge. In short, based on conservative measurement of benefits, it appears that ICD can stand on its own merits as an attractive and sound national investment. A safer, more secure nation will be better able to channel more of its resources and energies into economic growth and community development.

Following development of the Feasibility Study and Financial Plan, ICD roll-out will launch with one or more Pilot Programs. Pilot Programs will both “field test” the ICD operations and will kick off important programs of community preparedness and safety. A 6-9 month running Pilot Program, with about 3 months of set-up and preparation time, could cost approximately $2.5M, depending on the level of in-kind contributions of resources available from the Pilot City. Effective performance measurement of the Pilot results can help fine-tune ICD implementation to deliver impact on a broader, national scale. Pilot communities will benefit from leadership-oriented programs that enhance local preparedness, education, and response.

Internet Civil Defense: Feasibility Study

I. Overview of the National Need and the ICD Approach

What is Internet Civil Defense?

Internet Civil Defense (ICD) is designed to substantially enhance national preparedness and response to both terrorism and natural disasters. ICD is a national (and ultimately, international) system of information sharing, education and analysis via the Internet to connect the general public, emergency responders, local and national investigative authorities, and scientific experts and public health officials around the globe in real time for the common purpose of increasing public safety and security.

ICD will enable multiple neighborhoods, practitioners, and the emergency community overall to become more effective by mobilizing millions of "eyes" to help rapidly detect and mitigate both terrorist threats and natural disasters. That information will be shared rapidly via the Internet across first responders, medical authorities, analysts, and investigators to enable coordinated, proactive response to emergencies. The information will be interpreted and converted to actions. For example, first responders will benefit from direct input from on-the-ground volunteers, connected via the ICD Network, to make them simultaneously more productive and safer. Scientists and medical experts from around the globe will rapidly contribute their expertise to speed diagnosis and design effective treatments. The public will receive accurate and timely information to minimize rumors and accelerate recovery from disasters. Overall, ICD will collect and deliver **actionable information** to enhance public safety and homeland security.

As discussed in detail below, ICD will create an "umbrella" framework to raise the overall effectiveness of national Emergency Management (EM). The ICD System is being designed for three main purposes (Figure 1-1): (1) Effective mitigation of disasters through rapid, informed response; (2) Fear Management – by supplying the public with customized, accurate, timely, and knowledgeable information; and (3) ultimately, deterrence of terrorism through heightened detection of identified threats.

High-Level ICD Objectives **(Figure 1-1)**

- Mitigation of disasters - - both natural and man-made
- Public Education & Fear Management
- Ultimately – Deterrence of Terrorism via Heightened Detection

To achieve these objectives, ICD will preserve and leverage the best features of today's investigative and EM systems. These best features include well-functioning local public authorities and neighborhood mobilization organizations such as Neighborhood Watch.

ICD will complement and extend existing capabilities by creating three new elements of infrastructure to fill key gaps in the current system:

- **Neighborhood Network Building** to recruit and sustain vibrant community networks on the Internet; deliver public education via a Public Portal; direct the public to appropriate local authorities; and to mobilize volunteers to support mitigation operations, and for community-based organizations;
- One or more **Information Fusion Centers** to provide sophisticated integration of information to facilitate action;
- A **Mitigation Operations Center** to help coordinate timely, informed, and safe response activities.

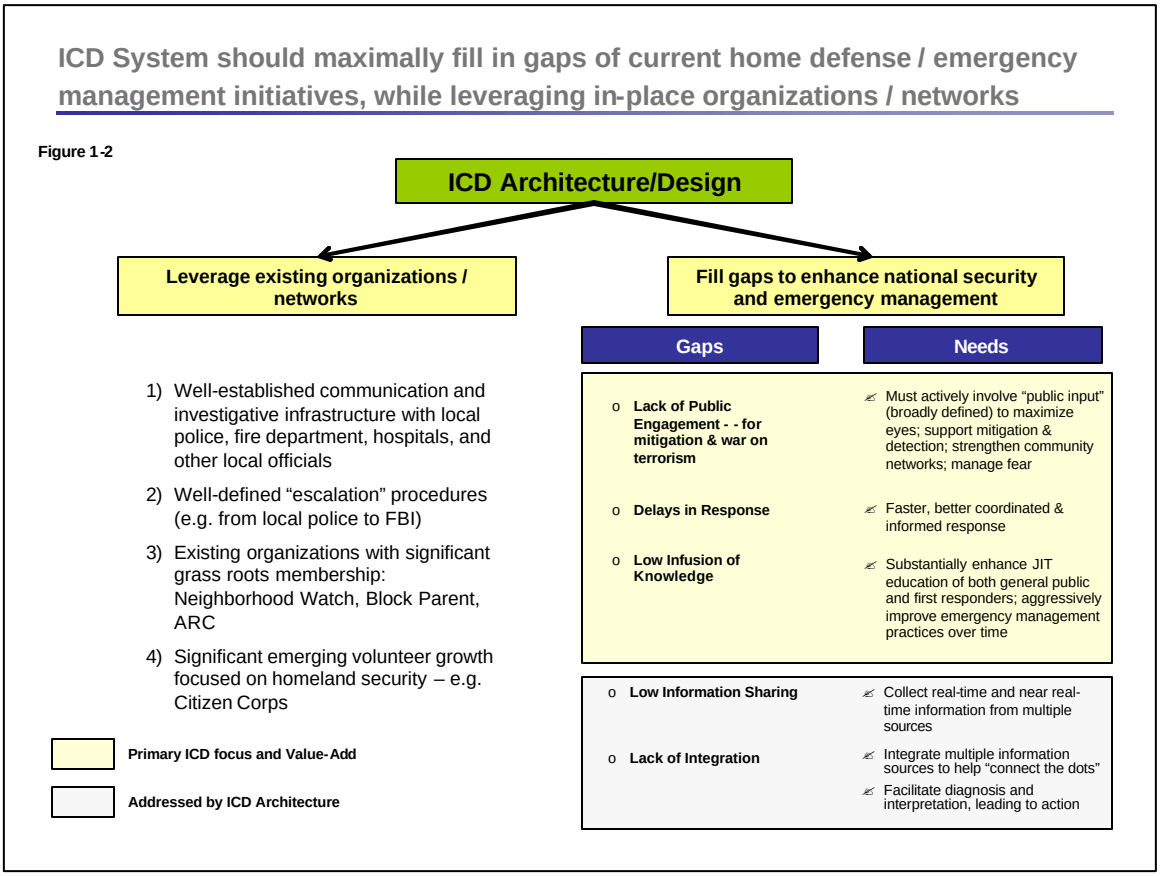
Why is ICD Needed?

The tragic events of 9/11 exposed the vulnerability of our national system of homeland defense. The New York City Partnership and the City Budget Department now estimate that the direct and indirect costs of 9/11 exceed $90B, including over $40B in direct insured losses (Source: Insurance Information Institute).

The ICD Feasibility Study has been a three-way partnership teaming between DARPA, FEMA, and the American Red Cross (ARC) to assess how the Internet and related technology tools could empower public participation and preparedness, connect various Emergency Management entities, and thereby improve EM effectiveness through an overall "systems approach." We recognized early on that a "next generation" EM system should have broader function than mitigating terrorism – among other reasons, the processes for mitigating man-made and natural disasters overlap very substantially. In particular, the quality movement in business has now ingrained the philosophy of finding root causes and proactively solving problems. Similarly, rapid detection and mitigation of disasters can help substantially to reduce damage and human suffering.

Numerous studies have now analyzed the strengths and weakness of our national system of preparedness and response. In fact, the "system" is not a true system today in the sense of having highly-coordinated functions; but really defines the collective capabilities of investigators, first responders, communities, and other participants. ICD will help to build the "connective tissue" that enables distributing actionable knowledge to create superior preparedness and response. ICD-enabled connectivity will thereby boost systemic response capability and, in turn, enhance social resilience to threats.

ICD is being designed to fill in key gaps in EM practice and coordination, while leveraging the strengths of the current system, as portrayed in Figure 1-2 below. Strengths to exploit include: well-established local-level investigative and response structure (e.g Police, Fire Departments, and Public Health Departments); well-defined "escalation" procedures for more complex investigations (e.g. from Local Police to State Police or FBI); existing organizations with significant grass roots participation, including Neighborhood Watch, Block Parent, and ARC; and emerging volunteer growth focused on Homeland Security issues, including Citizen Corps.

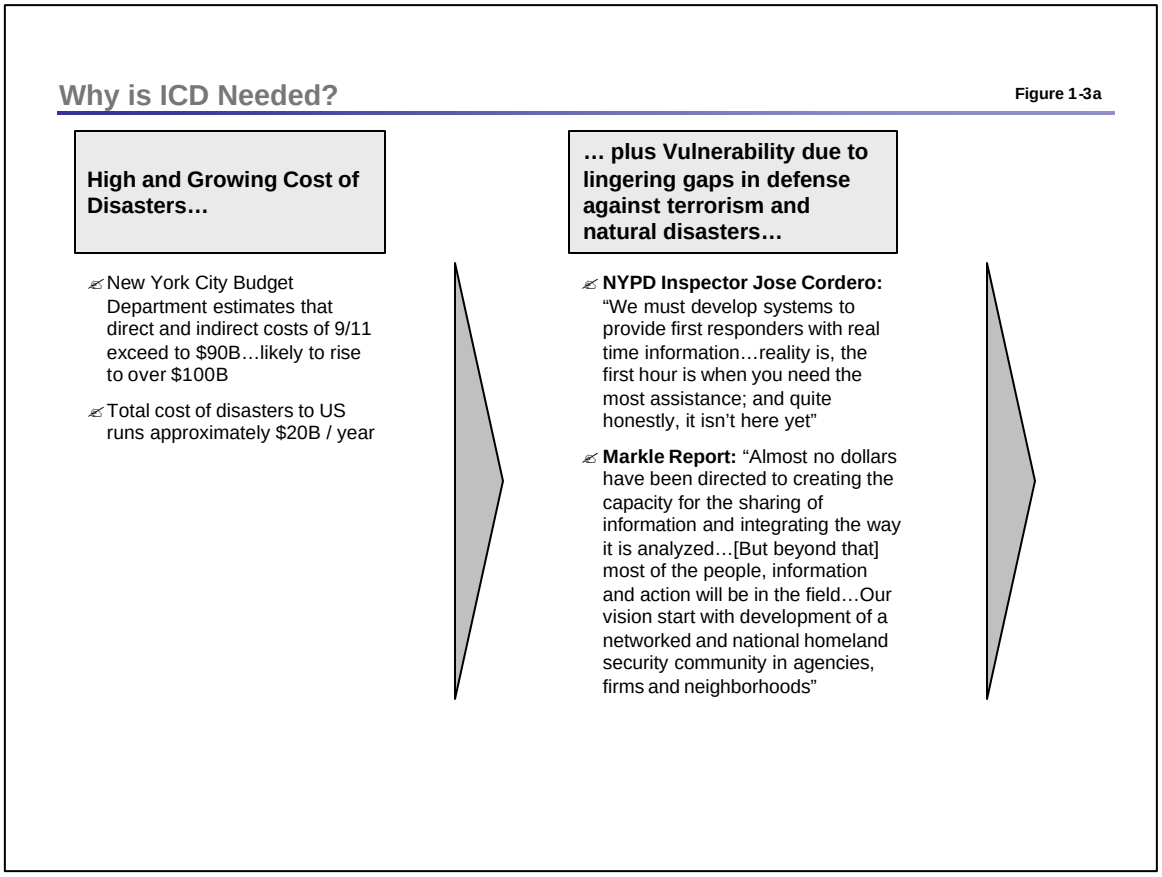


However, the figure also highlights five key gaps. The ICD system is being designed to address all five, with a primary focus on the top three listed in Figure 1-2.

Relatively low Engagement of the General Public and Community networks in mitigation activities and in the War on Terrorism is the first current gap. Despite the notable success of organizations such as Neighborhood Watch, such efforts remain decidedly "low tech": Information is recorded largely on pad and paper, and there is no rapid and consistent vehicle to escalate important local-level information up for higher-level observation and pattern recognition. Reciprocally, the public lacks credible, trusted information sources, both to help prepare to withstand potential crisis and to accelerate recovery from actual crises. The bipartisan Markle Report, "Protecting America's Freedom in an Information Age," highlighted the key role of public involvement: "The problem is not just information sharing among federal agencies in Washington DC…most of the people, information and action will be in the field – in regional or local federal offices, in state, regional, and local governments, and in private firms… Our vision starts with development of a networked and national homeland security community in agencies, firms, and neighborhoods."

The next gap is protracted Delays in Response to evolving crises. NYPD Inspector Jose Cordero was quoted: "We must develop systems to provide 'first responders' with real-time information for their response to a critical incident. The reality is, the first hour [after a terrorist attack] is when you ... need the most assistance, and quite honestly, it isn't here yet" (Figure 1-3a). Similarly, David Paulison, Administrator of the USFA

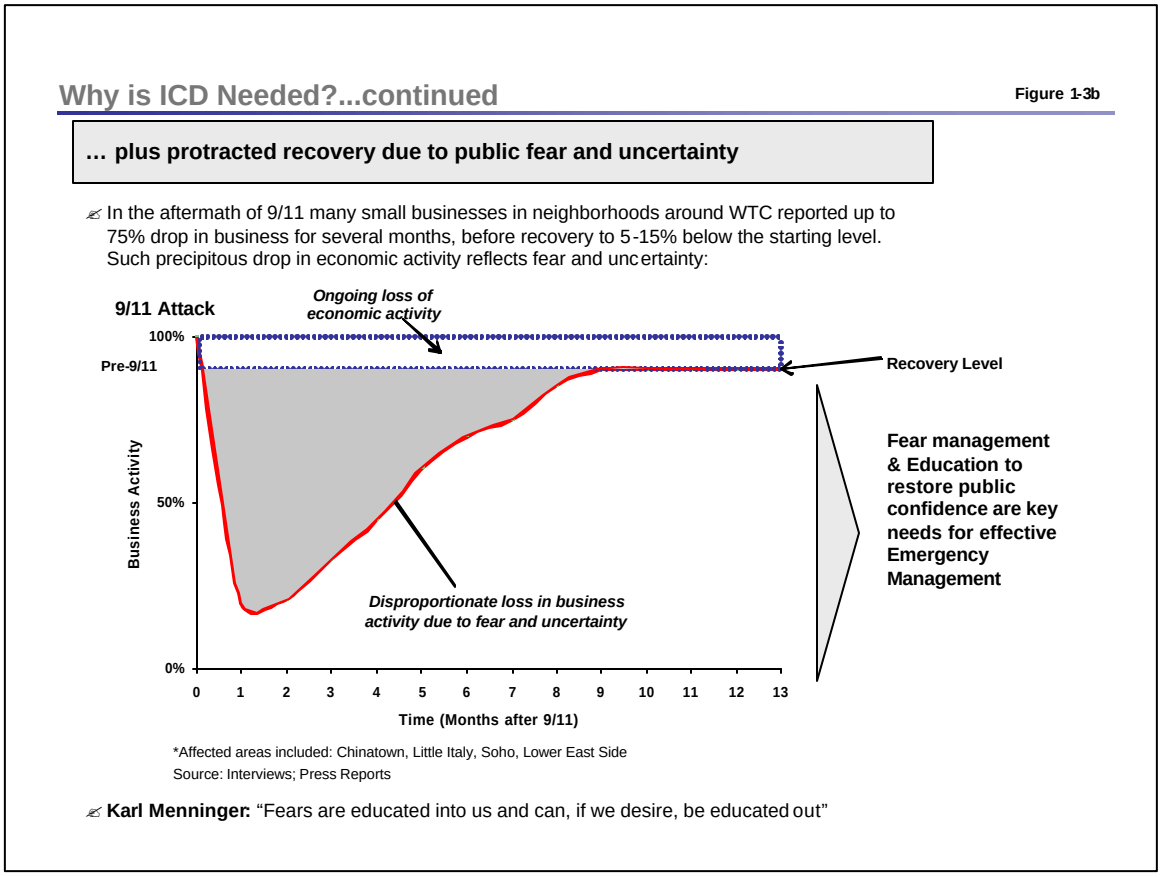
within FEMA observed that "Advance knowledge of the target area and the type of attack (bomb, chemical, radiological, biological and/or cyber) can make a vital difference in their readiness to mitigate the consequences of an attack". Distributed threats, such as agricultural bioterrorism, also risk late detection that escalates human and financial costs.



Low Infusion of Knowledge is the third high-level gap highlighted in Figure 1-2. Just-in-time education and knowledge are needed to support the first responders and to educate the public. Moreover, expertise must be leveraged over time to create "Best Practices" that are rapidly shared across community networks. The Markle Report identified the value of creating: "Communities of practice – groups of participants in fields like public safety, transportation, agriculture or energy – [that can] collectively act in a network. These communities benefit greatly from increased connections to those with similar roles in different organization or at other levels." Similarly, the President's plan for DHS is designed: " [to] ensure the preparedness of our nation's emergency response professionals … And it will continue to change the emergency management culture from one that reacts to terrorism and other disasters, to one that proactively helps communities and citizens avoid becoming victims."

One important focal point for Knowledge Infusion is to provide reliable information to the public; thereby, help to minimize the spread of rumors; and generally help manage fear during a crisis. Figure 1-3b highlights one "bottom line" consequence of fear and

uncertainty: **High and growing costs of disasters combined with lingering gaps in the defense against natural and man-made disasters are leading to extended recovery periods due to public fear and uncertainty.** In the aftermath of 9/11, many small businesses up to several miles north of the WTC reported up to 75% drops in business for several months, eventually recovering to a level 5-15% below the starting level. Such precipitous drop in economic activity is largely a consequence of fear and uncertainty. In the face of uncertainty, consumers cut back their spending and businesses stop holding inventories, both depressing local economic activity. On the positive side, helping to rebuild hope and accelerate recovery can help make crises shorter and less debilitating. Karl Menninger's observation is telling: "Fears are educated into us and can, if we desire, be educated out."



Low Information Sharing across key agencies is a fourth gap in current practice. The Markle Report observed: "Almost no dollars have been directed to creating the capacity for the sharing of information and integrating the way it is analyzed, so that out of important collection comes enhanced knowledge." Numerous agencies functioning largely as "information silos" are symptomatic. Indeed, the President's report on the new Department of Homeland Security (DHS) recognized that today, "Multiple intelligence agencies analyze their individual data, but no single government entity exists to conduct a comprehensive analysis of all incoming intelligence information and other key data …"

This assessment leads to the final performance gap: Lack of Integration of Information, to yield timely, well-founded actions. The Markle Report makes the point well that "Knowledge does not come from the accumulation of random data, but rather it is found in thoughtful and informed inquiries." For this reason, the President's proposal for DHS recommends "a unit whose sole mission is to assemble, fuse, and analyze relevant intelligence data from government sources…and data gleaned from other organizations and public sources. With this big-picture view, the Department would be more likely to spot trends and would be able to direct resources at a moment's notice to help thwart a terrorist attack." However, implementation of this laudable vision remains to be accomplished.

Generalizing from the above analysis, a national system is needed that performs a delicate "balancing act" to optimize both "local" and "global" contributions:

- **At the Local level:** Empower families and communities to get involved in preparedness through community networks; preserve the responsibility and accountability of local agencies.
- **At the Global level:** Provide high-value coordination, tools, and education to make the overall system more effective; be the focal point for integrating and interpreting multiple data sources – feeding back to enable and enhance local level analysis, investigation, and response; Manage fear and educate the broad public.

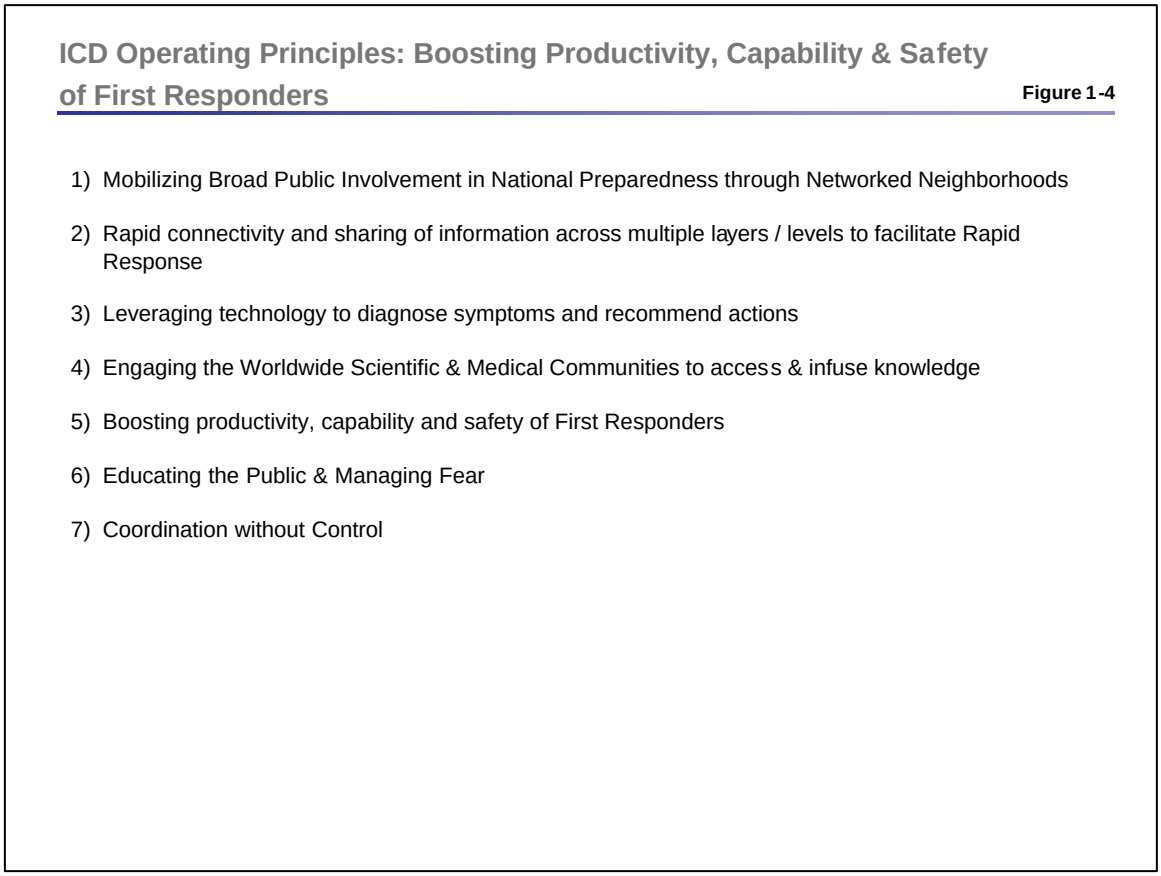
Overview of ICD Approach and Resulting Architecture

This section describes the ICD approach in terms of three growing levels of specificity, culminating in a specific ICD "Architecture," meaning overall design. The three levels are:

- Broad Operating Principles
- Activities across an End-to-End Value Chain to create the framework for a more effective national system of preparedness and response
- An "Architecture" of how ICD will be implemented in the field

ICD Operating Principles

Figure 1-4 characterizes seven Operating principles that begin to define the ICD approach.



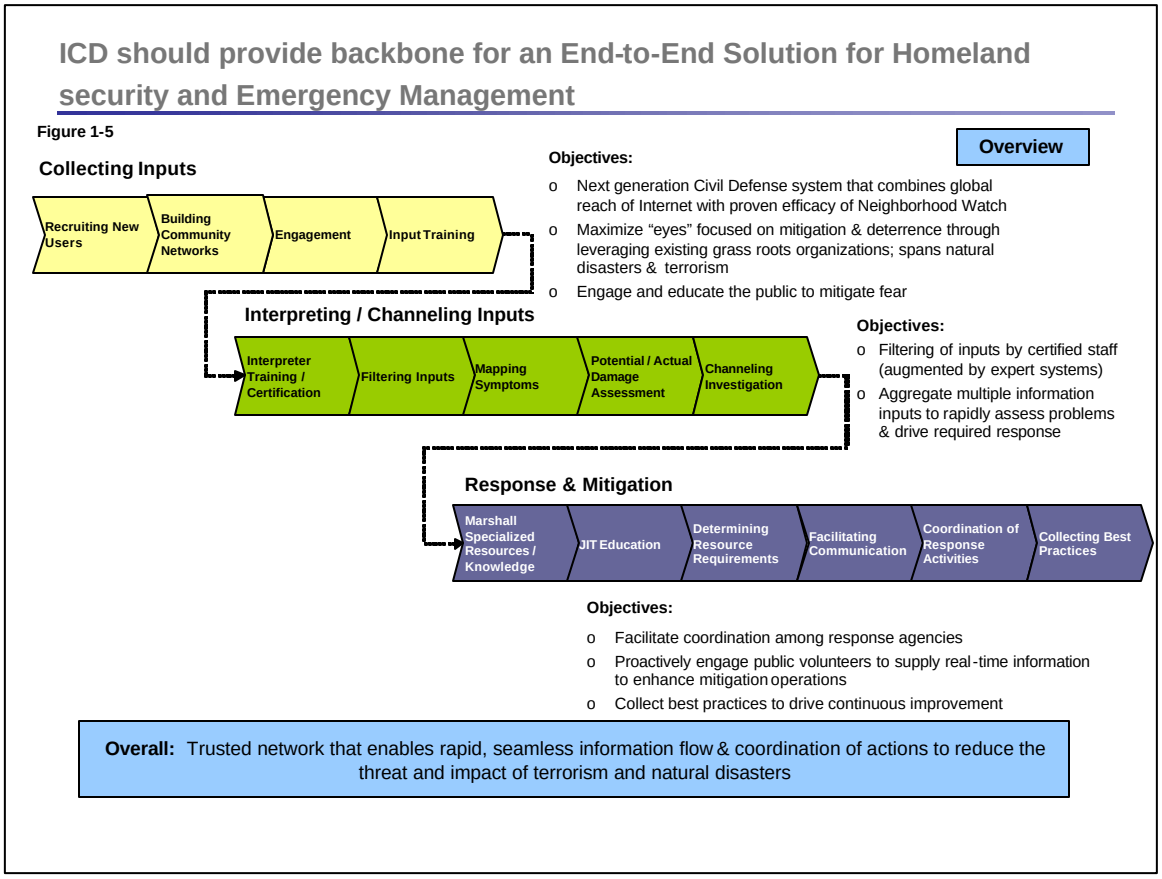
1. **Mobilizing Broad Public Involvement in National Preparedness through Networked Neighborhoods**. The ICD network will build community networks that comprise a trusted network of friends, to connect citizens as well as local and national Civil Defense and Homeland Defense organizations to each other on the Internet to form an Internet Civil Defense. The ICD approach parallels and complements efforts of local-based organizations such as Neighborhood Watch that marshall community attention to look out for neighbors and thereby combat crime. The key commonality is multiplying the number of "eyes" that are focused on mitigating, and ultimately preventing, disasters. Simply put, 5 million, and eventually 10+ million eyes focused on response and mitigation will substantially boost the power of 4,000 epidemiologists and 1M police, plus other authorities, in the nation. This new model building up from community networks constitutes a broader, "flat," nimble organization to combat terrorism, and to mitigate all disasters. Community networks can fulfill needs that only true locals can help with – like identifying where elderly or disabled people are who need help during a crisis. Moreover, actual "physical" communities such as neighborhoods can interact with "virtual communities" – such as the major professional organizations like National Emergency Management Association NEMA – to share ideas and help create valuable knowledge.
2. **Rapid Connectivity and Sharing of Information across Multiple Layers/Levels to Facilitate Rapid Response.** To be effective, information must

be shared rapidly across organizations to yield actionable information for Emergency Management. For example, local information must be aggregated up to a State, Regional, or even National level to reveal patterns. Required and current response capacity in an affected locale must be transmitted to adjacent communities to support response actions. We as a nation can no longer tolerate the inefficiencies from isolated "Islands of information" that are an artifact of the past but can now be remedied via ICD. At the same time, ICD can help to "customize" and filter information to prevent overload.

3. **Leveraging Technology to Diagnose Symptoms and Recommend Actions.** Human analysts must be complemented by information technology tools that reveal patterns, predict resource needs, and plot out affected areas, to boost the effectiveness of mitigation and response operations. ICD is being designed so that new technologies can be "layered" into existing processes relatively seamlessly, to make those processes more powerful over time.
4. **Engaging the Worldwide Scientific & Medial Communities to Access and Infuse Knowledge.** ICD will enable linking worldwide communities of experts to share key knowledge, including diagnoses, experiences, best practices, treatments, education programs, and outlooks. For example, the leading experts on cholera, or other diseases, may be in Brazil. Similarly, U.S. practice can benefit from international experience – like the release of Anthrax into a Russian ventilation system several years ago. An important precedent for ICD is Global Health Net (GHNet), headed by Dr. Ron Laporte, which has created a virtual community of over 10,000 scientists in more than 140 countries, who are sharing PowerPoint lectures on preventive medicine around the world, for the benefit of all participating countries.
5. **Boosting Productivity, Capability and Safety of the First Responders.** The First Responders are truly where the "rubber meets the road" in emergency response. These key actors can be made more efficient and effective with better information – including JIT information from people on-the-ground in the midst of an evolving crisis; better planning & coordination tools; and better training, including through sharing of Best Practices across communities of the Nation.
6. **Educating the Public & Managing Fear.** ICD will become a central vehicle to educate the public about "Community Disaster Education" and to achieve a much higher level of public awareness, understanding, and involvement than is possible today. In particular, fear and disruption are the primary aims of terrorism. The ICD system will exert a major benefit by providing knowledge and accurate real-time information, and by triggering proactive responses that help to reduce fear and mitigate the propagation of fear. ICD will thereby help fulfill the vital function that Ralph Waldo Emerson recognized in 1837: "Fear always springs from ignorance."
7. **Coordination without Control.** ICD is built from the premise that local authorities and first responders need to preserve their responsibility and accountability. At the same time, better coordination is clearly needed. Therefore, the ICD philosophy rests with providing tools and knowledge to boost local productivity; and providing the minimum level of control needed to achieve coordination while preserving self-direction and motivation.

Value Chain to Create an End-to-End Solution

ICD is designed as an "End-to-End" solution to enhance National capability for effective mitigation, response, and detection. Figure 1-5 portrays the keys activity steps subsumed in ICD. The activities are organized into three broad headings: Collecting Inputs; Interpreting/Channeling Inputs; and Response/Mitigation.



Each set of activities fulfills key missions to support Homeland Defense and superior Emergency Management. For example, the activities for Collecting Inputs are the "front line" in mobilizing public participation, to combine the strengths of Neighborhood Watch-type programs with the accessibility and reach of the Internet. Building a national network of "eyes" available to respond quickly to emerging crises will provide a valuable capability for mitigating all disasters, of whatever origin. To keep this network active, the public must be engaged – both through useful content and through interconnected community networks. The target outcome is that multiple communities around the country will be active viewers of ICD content and active in family-level and community-level preparedness activities.

The next set of activities for Interpreting & Channeling Inputs will combine multiple inputs, originating with the public and transmitted through various public agencies and

investigative channels, to filter out what information is important to follow up on; detect patterns that point to potential terrorist acts; map out symptoms of emerging crisis – such as the "plume" of a growing flood, or the analogous plume of affected water supplies in the event of bio-terrorism; project out potential damage; and help channel appropriate investigative authorities to the affected areas.

The third set of activities for Response & Mitigation represent proactive processes to accelerate and enhance actions of the First Responders. Response & Mitigation Processes work both in the field – in the midst of crisis – and in the aftermath of crisis, to improve long-term response capabilities. In the field, these activities will help to coordinate the activities of First Responders, including providing them with on-the-ground information and tools to guide safer and more productive interventions. Fear Mitigation will be an explicit focus of JIT educational programs. Over the longer-term, Best Practices will be collected, analyzed to verify effectiveness, and then disseminated across the national community of responders.

This "continuous improvement" thrust has parallels to successful programs in business management to raise product quality and competitiveness over time. For example, continuous improvement is fundamentally how the cost of microprocessors drives down over time, yielding more powerful – and less expensive – PCs and networked computers. It is fully consistent with, and will contribute to fulfill, the DHS mission for a "comprehensive risk-based, all hazards emergency management program of preparedness, mitigation, response, and recovery."

Figure 1-6 further details the key activities and output measures for each set of processes. Figure 1-7 describes detailed objectives of ICD from an end-to-end solutions perspective. The top two objectives are ICD are Mitigating Disasters more effectively and Mitigating Fear. Additional objectives – including fostering better emergency preparedness and building a more, resilient society that can recover faster from disasters – are mainly enablers for more effective Mitigation and Fear Management. Accomplishing these objectives can not only create a safer, more secure society, but can also yield tangible economic benefits. For example, a McKinsey & Company study for New York City shows how 9/11 has precipitated job cutbacks and loss of productivity; plus, prompted businesses to re-think their location decisions (Source: McKinsey & Co. presentation on Economic Impacts of 9/11). On the positive side, a safer society can direct more of its resources and energies to economic growth.

Collecting grass-roots inputs is key to prevention, deterrence & mitigation

Collecting Inputs

Figure 1-6a

	Recruiting New Users	Observations / Information	Engagement	Input Training
Key Activities	o Get current 18+M people involved in Neighborhood Watch onto ICD Portal to make them even more effective o Partnerships with other community-based organizations o Efficient marketing pre-launch o Provide unique information and valuable content o Increase number of unique visitors	o Build a growing set of community networks that leverage technology to enable & enhance Neighborhood Watch o Recruit and build membership through schools, churches, other community organizations o Coordinate with community organizations to elect & train On-the-Ground coordinators in each neighborhood o Build volunteer networks for mitigation	o Relevant, timely information on interesting subjects o Make it easy to use – e.g. instant links from AOL./MSN o Real time chat and activities o Measure levels of engagement and participation levels by communities to enhance the network over time o Compelling content that keep users coming back	o Train people to recognize anomalies and to report them as "facts," not judgments o Simple, on-line training to maximize effective reporting of inputs; increase communication skills of users; enhance on-the-ground input for mitigation o Foster "neighbors looking out for neighbors" through observations, not judgments o Preparedness assessment at community level
Outputs	o Network of 10M+ "eyes" focused on mitigation support and reporting anomalies to local authorities o Growing over time o Extending over time to create a sense of belonging: Local to Regional to National to International	o Well connected network of actively participating individuals,working to enhance community safety & survivability o Prime ICD growth by building up "eyes" in many neighborhoods o Efficient communication of observations/information o Trained "Block Captains" knowledgeable in filtering inputs o Local initiative to create specific local content (e.g. neighborhood newsletters)	o Sustain high level of ICD usage by new and existing users o Build "word of mouth" to attract New Users o Create sense of belonging & commitment to community preparedness and safety o Measuring key trends (e.g.consumer sentiment; preparedness)	o Create base level of awareness for large number of people o Facilitate early detection of disasters and observation skills to support mitigation o Learn what type of information is most valuable to collect o Build confidence that neighborhood is prepared to respond & recover from any disaster / attack

Interpreting/Channeling makes Investigation Process more Focused & Better Informed

Interpreting / Channeling Inputs

Figure 1-6b

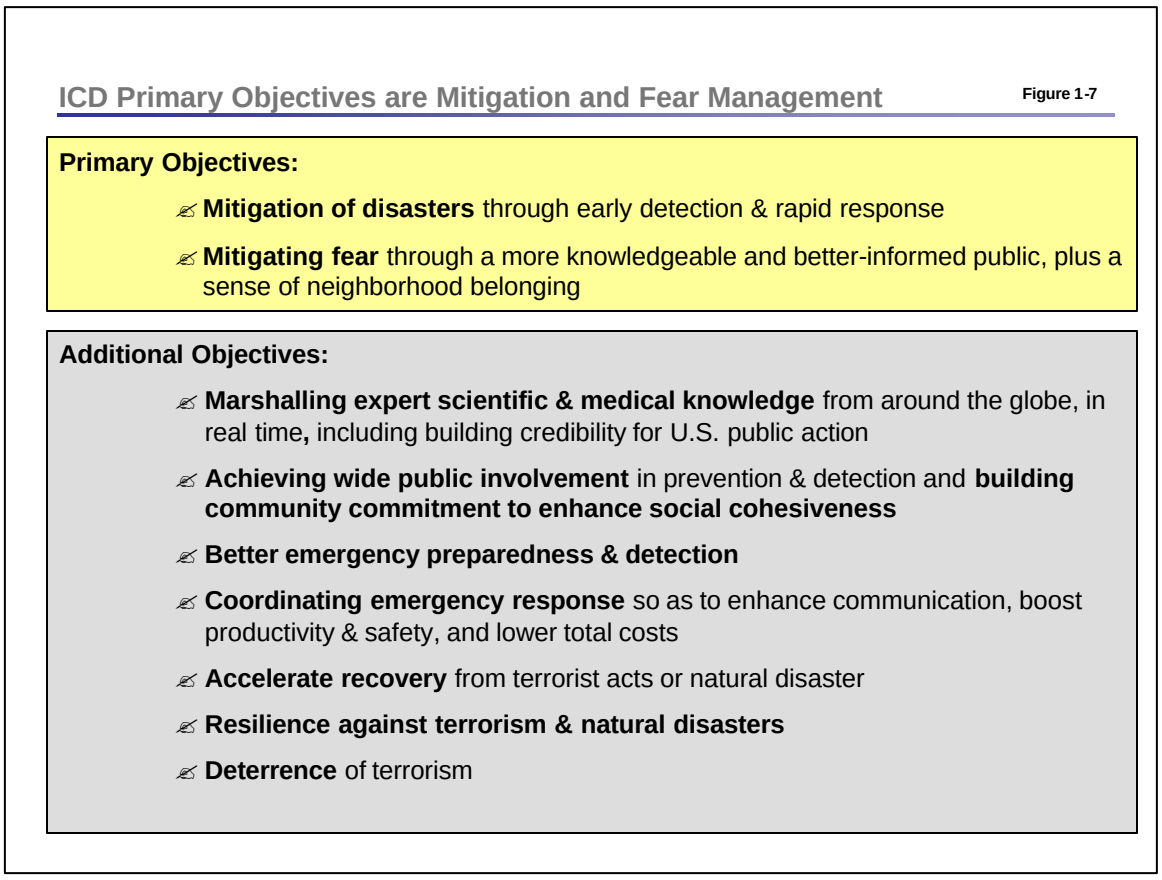
	Interpreter Training / Certification	Filtering Inputs	Mapping Symptoms	Potential / Actual Damage Assessment	Channeling Investigation
Key Activities	o Work with local organizations to train On-the-Ground Coordinators & local volunteers / employees to efficiently interpret public interactions on ICD site; how to channel investigation o On-line certification process	o Prioritize public inputs / tips (high, low, etc.) o Understand which inputs deserve follow-up investigation; through which response agencies o Cascade information up from local level to Metro to National	o Aggregate inputs from multiple ICD sources to map emergent symptoms o Thereby provide information to facilitate early detection/ diagnosis (e.g. West Nile fever in LA) o Visually show "plume" of emergent symptoms	o Collect information from multiple sources to enable damage inspection & assessment o Proactively broaden information sources; use volunteer on-the-ground network o Project potential damage, as well as actual damage, and plan response	o Direct public to which institutions need to be notified, and thereby help launch investigations
Outputs	o Cadre of trained & certified staff, analogous to "Block Captains" in Neighborhood Watch o On-line certification promotes scalability o Enhanced skills in community mobilization and observation	o Effective & efficient working relationships with Police and other public, private sector , NGO institutions o Trigger local action while feeding information upward o Linked networks sharing information across local, Metro, National levels to detect trends and potential problems early-on	o JIT communication of symptoms to response agencies o Certified ICD staff proactively solicit inputs to broaden information o Frequency maps of reports over time; provide better predictors o Help mitigate fear via knowledge o Provide feedback to input providers; reinforce involvement	o Just-in-time information that is "crystal-filtered" for specific emerging events o Accurate information & simulation to drive resourcing injuries; locations; $ impact; potential hazards o Mitigate damage via early projection & targeting	o Enable rapid follow-up to facilitate deterrence and minimize potential damage o Smoothly-functioning investigation & escalation procedures help to share and synthesize critical information

Effective Response can simultaneously Mitigate Problems; Boost Coordination; Improve Cost-effectiveness

Response & Mitigation

Figure 1-6c

	Marshall Specialized Resources / Knowledge	JIT Education	Determining Resource Requirements	Facilitating Communication	Coordination of Response Activities	Collecting Best Practices
Key Activities	o In real time, access specialized expertise around the globe – e.g. expert on Cholera residing in Brazil; urban terrorism expert in Israel o Maintain global network of medical & scientific contacts	o Deliver JIT education to response institutions (e.g. fire safety procedures for chemical fires) o JIT education to the general community o Preparedness education	o Estimate what resources are required to respond to a specific threat (e.g. shelters, food, etc.) o Help quantify specific resource requirements, at local level, during "stand-by mode" and in the event of an attack/threat	o Real-time communication vehicle among response agencies o Collect and feedback "global view" of emerging situation to make all agencies more effective o Secure information broadcast network; customized to community	o Communicate shared "global view" and evolving changes to key agencies o Enable sharing of information about available resources & resource gaps o Help channel simultaneous surveillance & response	o Data base system to collect and record Lessons Learned and Best Practices (e.g. applying technology to enhance response agency coordination) o Analyze & archive historical events for future learning
Outputs	o Tap specific knowledge needed for assessment/ response/ communication o Evergreen network of contacts that is on call	o Make response agencies better informed & coordination more productive; reduce risks o Mitigate fear via knowledge o Improve response coordination (e.g. via contact checklists)	o Coordinate resources across agencies o Help minimize redundant/ overlapping activities	o Achieve effective interdependence across CD agencies, without loss of autonomy o "Big picture" view aggregates real-time information from multiple contacts o Mitigate problems via JIT knowledge o Specific, local alerts	o Enable coordination and boost mutual productivity without central authority & while preserving accountability of response agencies o Provide more sophisticated technology over time – e.g. database with universal access by key agencies	o Enhanced response systems via learning from experiences of many communities o Collection of "Best Practices" that can be applied (a) during crisis and (b) for ongoing Continuous Improvement of all ICD and Response processes

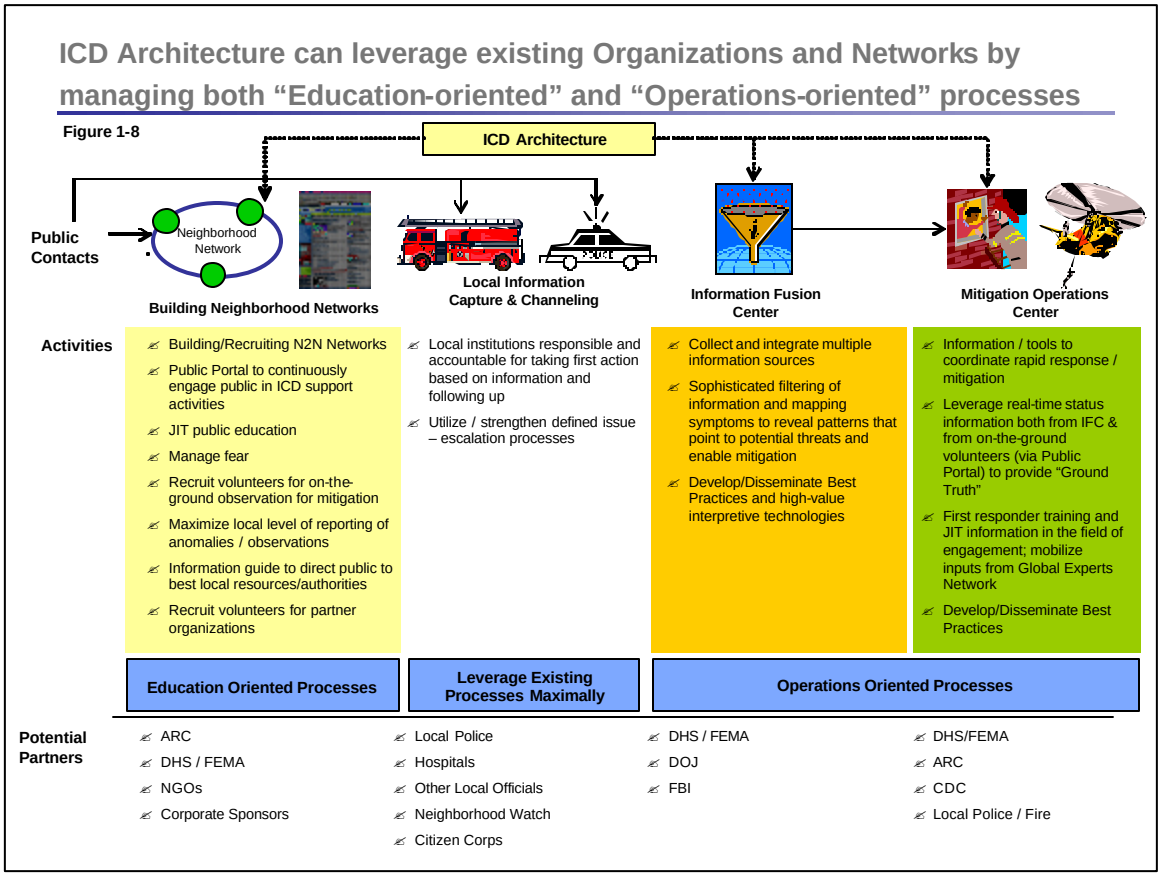


Architecture for ICD Implementation

Figure 1-8 translates the ICD Value Chain into a specific "Architecture" for implementation. Just as a building – or a computer system, for that matter – is built on specific architecture that characterizes its style, appearance and overall approach, so too it is useful to characterize the ICD Architecture.

As mentioned earlier, the ICD Architecture is being designed to maximize reliance on existing institutions. In the figure, the second box from the left represents existing institutions that are the front-line contacts of the public – the local Police Department, Public Health Officials, 911 lines, and organizations such as Neighborhood Watch. These primary contact points would be unchanged from what the public uses today.*

[* Note: The ICD Architecture has evolved through evaluation of alternative options to optimize the tradeoffs between reliance on existing institutions vs. effectiveness and speed of information capture. Appendix A describes one alternative architecture and the criteria for choosing the architecture presented here as preferred.]



The ICD Architecture consists of three components: At the "front end," **Neighborhood Network Building** will mobilize community networks to substantially enhance neighborhood-level visibility, to support local mitigation operations, and to inform and educate the public via the ICD Public Portal. At the "back end," one or more **Information Fusion Centers** will synthesize and direct information; and a **Mitigation Operations Center** will facilitate safe, fast, and productive emergency response.

Neighborhood Network Building will create multiple Neighbor-to-Neighbor (N2N) trusted networks that increase community cohesiveness and provide On-the-Ground Observer volunteers to support and inform mitigation operations. ICD will partner with existing organizations such as American Red Cross (ARC), Neighborhood Watch and Citizen Corps to aggressively build up a national network of citizens who promote family-level and community-level preparedness and participation. ICD users will also be readily able to create network "Locator directories" of "friends and family" that will help them all to stay in touch and communicate in the midst of any crisis.

The Public Portal will be the primary ICD contact point with the public. ICD programs will be "co-branded" with partner organizations. In this way, ICD will leverage and enhance existing institutions, without "competing" with them. The major reason to combine forces in this way is to build a broad national network of "eyes" to facilitate disaster mitigation and, ultimately, detection and deterrence.

The ICD Public Portal will aspire to be a "Highly-Recognized Source of Trusted Knowledge on Disaster Preparedness and Emergency Management." To achieve this, the Portal will deliver a variety of relevant and provocative content, that is aggregated from multiple authoritative sources, plus ICD-originated content. An ICD Board of Scientific Advisors will help to "vet" this content to ensure accuracy & timeliness. The Portal will also feature content such as live webcasts on topical issues surrounding terrorism and emergency management to engage the public and help create an involved, vigilant society.

As outlined in Figure 1-8, the Public Portal will direct the public to the most appropriate public authorities in their specific locale, but will not itself accept any direct inputs from the public. For example, behind the Public Portal will be a Call Center and e-mail Center whose operators will communicate regularly with the public. An individual could type in his/her zip code, and be referred to a specific list of local officials and resources. Or, alternatively, a citizen could call in to ask what to do with a dead crow in their back yard – which recently arose in conjunction with localized outbreaks of West Nile fever – and get both information and referral to local Public Health authorities. Thus, the Portal will provide a comprehensive "Referral Guide" to EM-related sources to help the public report observations and/or anomalies to the responsible public authorities.

The Public Portal will also distribute a variety of educational programs, in conjunction with ARC, FEMA, and other organizations, both on an ongoing basis and on a Just-in-time (JIT) basis in midst of crisis. The Public Portal will provide accurate, reliable information that helps to manage fear via information.

Lastly, the Public Portal will be a recruiting channel for volunteers, in concert with "off-line" recruiting programs in the community. Specifically, ICD will recruit volunteers for on-the-ground observation to support mitigation operations. These observers will provide invaluable information to the first responders – such as the extent and location and damage; location of elderly or disabled citizens; or, accessibility for response operations. In Emergency Management terms, the on-the-ground volunteers will provide "Ground Truth" – valuable, "live" perspectives on developing, fast-moving events that only locals can deliver. For example, American Red Cross reports that the best damage status information during the recent tornado disasters came from local observers, via the ARC Call Center. The ICD on-the-ground volunteers can help deliver this benefit at even a higher level, via organized connectivity, to enable superior mitigation response. The same ICD volunteers will also be encouraged to become active in their communities to build self-sustained community networks. Key activities include: Collect community e-mail lists; share preparedness information; plan drills and community events related to preparedness; and facilitate reporting of "anomalous" events to local authorities.

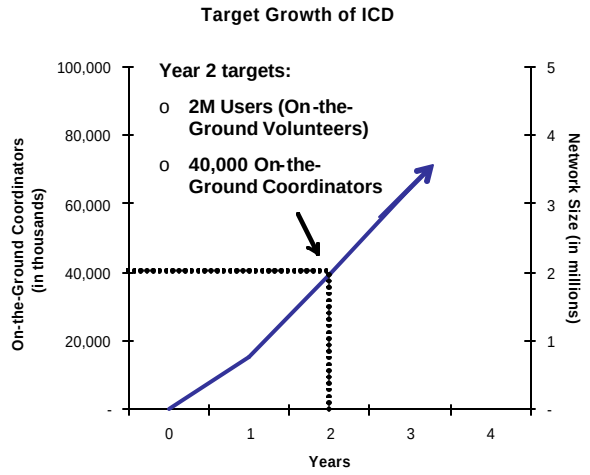
ICD will also recruit volunteers as Neighborhood On-the-Ground Coordinators with a role analogous to the "Block Captains" in the Neighborhood Watch system, as focal points for local activity and questions. Neighborhood Watch targets about 1 Block Captain for every 50 community residents. Using this proportion, an effective ICD

network should target total of about 2M overall users of the Public Portal within 2 years, as overall on-the-ground volunteers, and about 40,000 On-the-Ground Coordinators (Figure 1-9). The network must grow beyond that, to 5M+ total users to achieve significant national coverage. The fundamental building block will be neighborhood networks that are activated and energized by the "Block Captain" Coordinators. The ICD Public Portal will also directly encourage the public to join community-based organizations such as ARC, Neighborhood Watch, and Citizen Corps, and will enable them to enroll on-line. Section VII discusses Recruitment Strategies in greater depth.

Target Growth of ICD Network for the First Several Years

Figure 1-9

Preliminary



Approximately 50:1 ratio of Total Observers (Users) to "Block Captain" Coordinators

ICD must prime network growth to achieve effective national coverage, including significant & sized network in areas with risk exposure

The natural "hosts" for Neighborhood Network Building, including the Public Portal, are ARC and FEMA/DHS, potentially in a "co-leadership" model. For example, the Public Portal has a strong educational mission that meshes well both with the objectives and skills of ARC and with the President's direction of DHS to provide a "single organization with operational responsibility that could communicate with the American people in a clear, concise, and consistent voice."

At the "back end" – or Operations-oriented side – of ICD, **the Information Fusion Center** (IFC) will collect and integrate multiple inputs to speed detection of potential events. IFC will help to "connect the dots" to identify problems – such as spread of disease, or multiple affected water supplies that could be a sign of bio-terrorism. IFC will

incorporate more sophisticated interpretive technologies over time to support its mission of early and useful pattern detection and focused alerts.

The need for capabilities like IFC is well articulated in the following quote by CIA Director George Tenet:

" The Department's [Homeland Security] most important role will be to correlate threat warnings and assessments about evolving terrorist strategies with a fine-grained understanding of the vulnerabilities of all sectors of the homeland and translate that into a ***system*** of protection for the people and infrastructure of the United States… We must design systems that reduce both the chances of an attack getting through and its impact if it does. We must address both the threat and our vulnerability. We must not allow ourselves to mentally "move on" while this enemy is still at large."

FEMA/DHS is probably the natural host of IFC, consistent with the "sole mission" of the proposed Information Analysis and Infrastructure Protection Division to "assemble, fuse, and analyze … information pertaining to threats." As discussed later (in Section V), IFC would involve shared resources and potentially distributed operations across multiple government agencies and State/Regional EOC.

Lastly, the **Mitigation Operations Center** (MOC) will provide tools and information to coordinate rapid response and mitigation. An example of a key tool that doesn't exist today (or at best, exists sporadically in select communities) is a database that enables the first responders and various community organizations, including ARC, to "pool" their resources – including food, shelters, and equipment – and take a global view of a disaster situation. That database would be visible by all agencies, and would help drive decisions to solicit specific emergency help from other locales or from the Federal Government. Such tools are a good example of "Coordination without Control."

The MOC would also leverage real-time status information coming from both the IFC and from the on-the-ground volunteers network mobilized through the ICD Public Portal. JIT information from the Global Experts Network can also provide critical operating guides – such as how to put out a particular type of chemical fire, or how to operate safely in 1000º temperatures. The vital role of timely status and operational information is well articulated in the following quotes:

"Collectively, the eyes and ears of our best trained safety professionals in each community will serve as the sensors for a national early warning system " … R. David Paulison, Administrator of USFA

"Our country's fire and emergency medical departments … will be first to deal with the consequences of any domestic terrorist attacks. We must be able to give them warnings as early as possible so they can take actions to minimize the potential loss of life and property" … Ron Dick, Director of NIPC

Building up neighborhood networks is an activity where ICD can work fruitfully hand-in-hand with existing community organizations. For example, the ARC Chapter in Atlanta, GA has similarly begun recruiting representatives from individual Homeowner

Associations to help drive community-oriented preparedness education. Citizen Corps now has over 170 Councils up and running. FEMA and HHS are cooperating to launch a Medical Reserve Corps.

The MOC will also have a training and continuous process improvement mission. For example, cataloguing then disseminating Best Practices can help to capture new ideas for the benefit of all communities. These Best Practices could range from a new information tool being used by Fire Fighters in, say, Alexandria VA, to innovative use of volunteers potentially originating in Portland, OR. The MOC will play a vital in encouraging communities to develop and document Best Practices; then provide an objective forum to validate them and rapidly disseminate exemplary practices. Translating these ideas into simulations, including "Disaster Flight Simulators" and innovative training materials can help forge much higher levels of preparedness.

Sections IV, V, and VI describes all the ICD functions in greater detail.

Guide to this Feasibility Study

With this background on ICD, Section II now develops the rationale for building powerful and cohesive community networks, drawing on the learnings from Neighborhood Watch. Section III addresses the issue of why the Nation needs an end-to-end system for Homeland Security and Emergency Management, and what are the tangible benefits. Section IV and following sections then begin to lay out more detailed operations of the three main ICD modules; followed by in-depth strategies for Recruiting, Technology Enablers; IT and Systems Architecture; Institutional Implementation Scenarios; and Pilot Programs. Interested readers can review the sections in sequence; or can skip to Sections IV-VI for deeper description of ICD, then come back to Sections II-III.

The companion document to this Feasibility Study, the **ICD Financial Plan**, develops detailed cost estimates for IFC, including Pilot projects; plus benefit/cost analysis.

II. Mobilizing Community Neighborhoods: Lessons from Neighborhood Watch

ICD emphasizes building strong community-rooted networks that are empowered with knowledge and information technology, to "cascade" information both upward and laterally, to interact and communicate with other physical and virtual communities.

It's a useful simplification to say that ICD is really the synthesis of two core ideas (Figure 2-1):

- **Leveraging the power of community networks** to mobilize public involvement and thereby rapidly multiply "eyes" that can be brought to bear on mitigation operations in multiple communities – as demonstrated successfully by Neighborhood Watch, and by the Civil Defense programs of the 1950s-60s.
- **Leveraging the Internet** to yield seamless, global communications connecting the public, First Responders, Emergency Management agencies, medical & scientific experts, and other key sources in a JIT customized mode.

Focusing on these two points is a simplification – because ICD involves other aspects such as Information Fusion and creating a Global Experts Network – but they are "core" in the sense that ICD could not exist without these two building blocks.

ICD Combines the Power of the Internet with proven efficacy of Civil Defense Systems & National Neighborhood Watch Programs

Figure 2-1

Proven National and Home Defense Programs | **Growing Presence & Power of the Internet**

Potential Results of ICD:

- Civil Defense and Neighborhood Watch have proven highly efficient in deterring violence; preparing the citizenry against attacks and crime; and managing fear
- Combing the above with the power of the Internet will enable seamless, global communications connecting the public, first responders, emergency management agencies, medical & scientific experts, and other key sources
- ICD will thereby enable technology-interlinked communities, combining "high tech" and "high touch" to help bring together and strengthen a nation that is still reeling from the effects of 9/11
  - Efficiently distribute up-to-date, real time information to calm and inform the citizenry
  - Provide an outlet for the public to make existing neighborhoods safer for families

What are the key principles of Neighborhood Watch relevant to ICD?

At a local level, Neighborhood Watch (NW) has proven ability to reduce local crime rates by 25-50% or more when implemented as part of a committed, sustained program of community involvement (Figures 2-2 and 2-3). NW thus provides an important model of community network building.

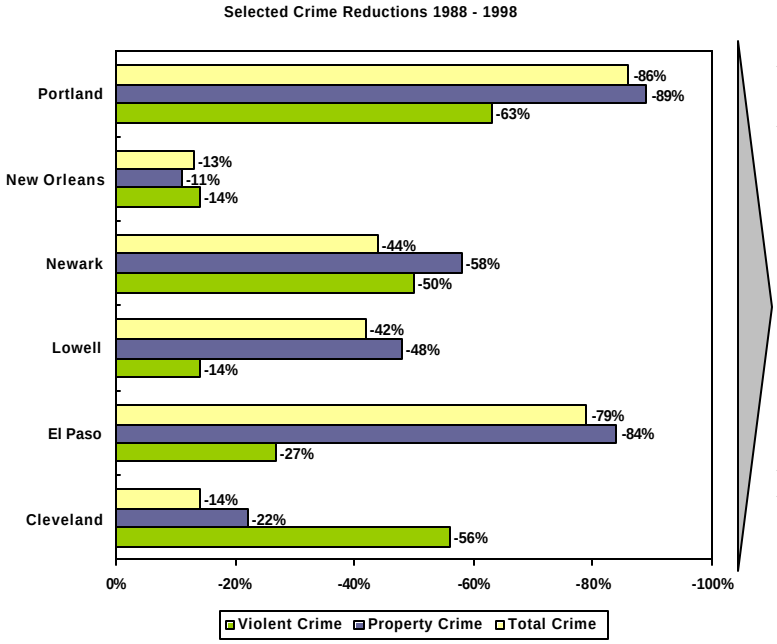
Effectiveness of Neighborhood Watch – Select Examples

Figure 2-2

Highlights of Effective Neighborhood Watch Programs Around the Nation	General Implications for Communities
✍ **Lakewood, Colorado:** The Community documented a 77% drop in burglaries after implementing a Neighborhood Watch Program	✍ Increases quality of life and reduces crime
✍ **Easton, Pennsylvania:** Crime rates dropped 29% after instituting a Neighborhood Watch	✍ Strengthens social control and restores a 'sense of neighborhood'
✍ **Warminster, Pennsylvania:** Saw a decline of 19% in property and personal crimes	✍ Increases social interaction and thereby community cohesiveness
✍ **Cypress, California:** Neighborhood Watch cut burglaries by 52% and thefts by 45%, and saved the local police an estimated $79,000	✍ Reduces the social isolation that feeds crime
✍ **Fairfax County, Virginia:** Has about 700 active watches and 15,000 – 30,000 participants. Reported burglaries dropped 90% after the inception of the Neighborhood Watch program	✍ Successful Neighborhood Watches have better communication with local law enforcement agencies
	✍ Thriving Neighborhood Watches expand the scope of the watch beyond the basics of home security
	o Sponsoring community cleanups; finding solutions to other community problems; helping the homeless; organizing food and clothing drives; are examples of broader activities that bring the community together

Community Involvement & Preventive Measures Show Potential to Substantially Reduce Crime Over Time

Figure 2-3

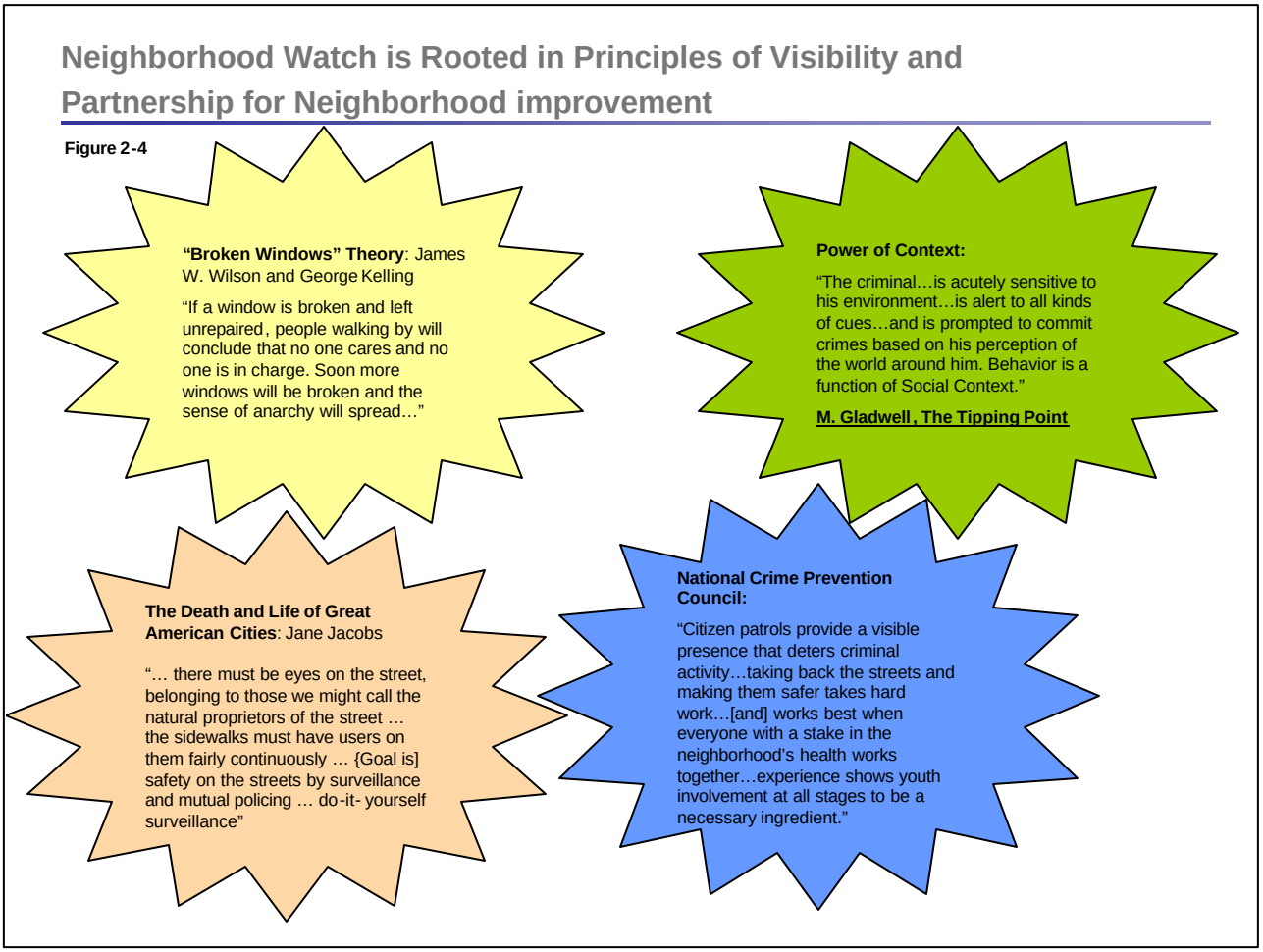


National Implications

- Variety of cities have implemented successful crime prevention programs to reduce overall crime
- Common underlying themes and principles:
  - Focus on the community – building trust and power within the neighborhoods
  - Acknowledging and addressing key problems
  - Well organized with a committed leadership; working together with local law enforcement agencies
  - Developing and implementing strategic approaches to public safety – well thought out plans driving action
  - Embrace & create mechanisms to enlarge the neighborhood network over time
- Communities are the major catalyst for change
- Prevention, Education and Economic Development generally must go hand-in-hand to achieve the most powerful impact

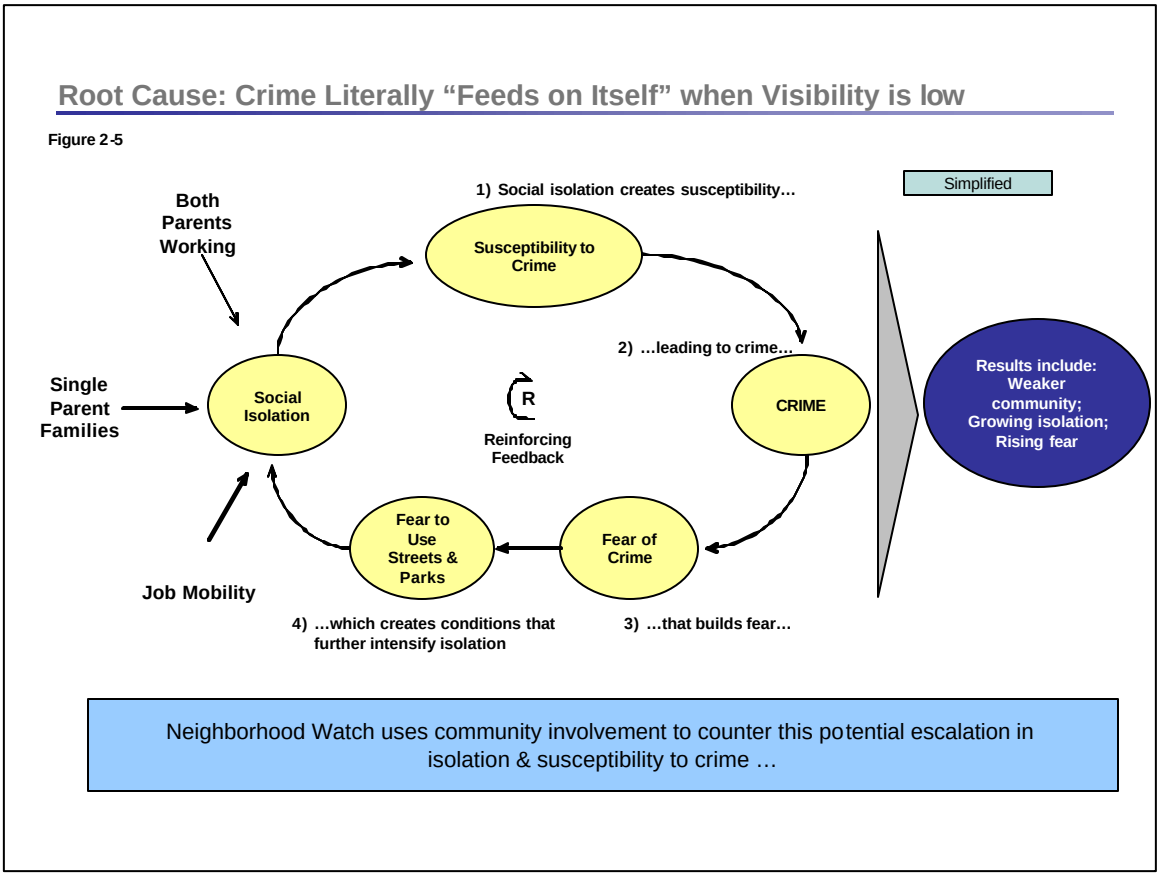
Source: Six Safer Cities: National Crime Prevention Council

Why does NW watch work? While there is no universal explanation, there are major, recurring themes, highlighted in Figure 2-4. For example, The National Crime Prevention Council emphasizes creating visible presence in the community to deter crime, plus involvement of multiple stakeholders, including youth groups. Malcolm Gladwell, author of the best-selling book "The Tipping Point" which describes the drop in crime rate in New York City, emphasizes "Context" – the fact that criminals are less prone to act in a community where crime is being controlled. In turn, Gladwell's thinking was educated by the "Broken Windows" theory of Wilson & Kelling which simply put, says that crime-infested neighborhoods draw more crime, and the reverse holds true as well. This is less a statement of "direct cause" than an observation that trends in crime get reinforced – for better or for worse.

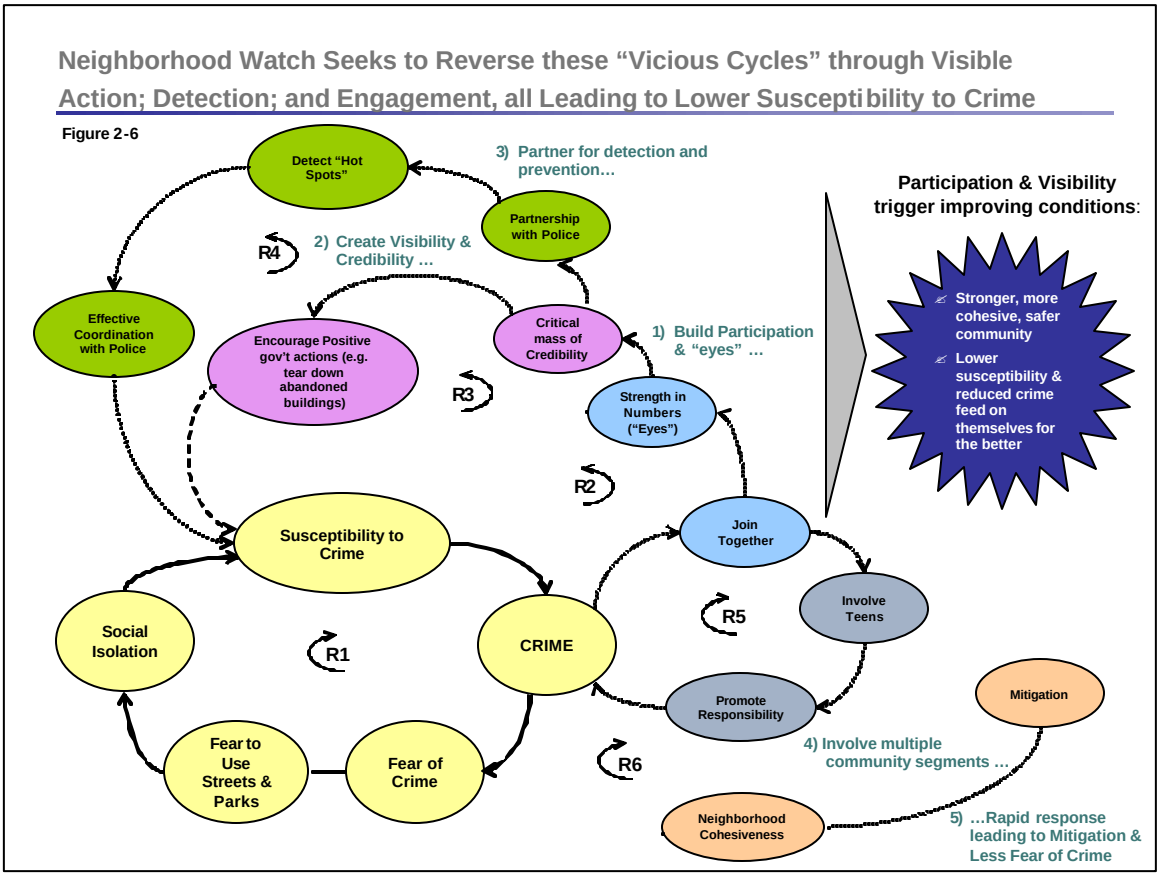


Finally, famous urbanist Jane Jacobs emphasizes the controlling role of activity and eyes on the sidewalks – what she calls "do-it-yourself surveillance," a form of "self-policing."

Figure 2-5 begins to integrate these cause-effect mechanisms into a systems framework. In the "perverse" direction, greater social isolation creates susceptibility to crime; which leads to more crime and to fear of crime; which keeps people off the streets and parks; and ultimately yields still greater isolation and even more crime. But the same mechanisms work in the "benign" direction as well: Less isolation yields less crime, less fear, more activity, and still less crime.



So how can communities trigger the system activity in the benign direction, to lower crime and vulnerability? That's where NW comes in, as mapped out in Figure 2-6. Banding together in NW-type programs creates more "eyes" focused on crime and on threats; which lowers crime; and reinforces success. This creates Reinforcing Feedback loop R2 which amplifies increases or decreases in crime through participation and resulting visibility. Feedback loop R3 further reinforces participation: By creating critical mass, the community has greater credibility and persuasion to shape positive government actions, like tearing down abandoned buildings. In feedback loop R4, effective working relationships with local police help to detect "hot spots" and further reduce crime and foster effective teaming. R5 involves teens to promote responsibility and provide alternatives to street crime. Finally, R6 shows how mitigation builds community cohesiveness, which comes full circle to reduce crime and build mitigation capacity.



Without attempting to tell a full story, several "kernels" stand out, as highlighted in Figure 2-7. Multiplying local networks raises visibility and can activate reinforcing spirals that reduce crime. Therefore, ICD needs to build networks that create neighborhood-level "critical mass." Partnering with community-based organizations like NW and Block Parent can help unleash these benefits – as can partnering with nationally-based, community-focused organizations like ARC and Citizen Corps.

Figure 2-7

Implications for ICD

- Activating "virtuous cycles" of visibility/detection/engagement requires a local approach superimposed on a national approach … starting point is multiple "eyes, ears and brains"
- Must build "critical mass" in target communities: implies that 20% participation in 1 community will yield superior results to 5% participation in 4 communities
- ICD recruitment must, therefore, start at the community level, working through existing organizations; culminating in strong, trusted local networks where neighbors will recruit each other and communicate actively
- Sustainability of participation is probably a function of perceived progress – which again argues for building neighborhood critical mass … that yields initial results … which spurs continued participation/engagement
- Target key networks in order to maximize impact: vulnerable geographies; proximity to key infrastructure; influential businesses willing to promote ICD
- NW partnerships with police & local government amplify civilian action … ICD analogies are partnerships with investigative authorities, first responders, other warning systems (e.g. FEMA), safety & Emergency Management practitioners, and scientific/public health communities
- Challenge is to prime network building; then replicate successes.

In the realm of ICD, community networks can help to accelerate mitigation operations, and can even lead to heightened observation and vigilance that helps to deter terrorism and acts of violence. While ICD is not a "reporting program," it helps neighborhoods get better prepared via education and tools; provides technology for neighbors to participate meaningfully in mitigation operations to make their neighborhoods more secure; and it provides information to community members to help report anomalous activities to local authorities. ICD will also help to maintain "constancy of purpose" to preserve and encourage vibrant community-based networks.

III. Why is an End-to-End Solution Needed for Emergency Management?

ICD is being crafted as an end-to-end solution for overall Emergency Management and mitigation of terrorism. As discussed earlier, ICD is not a "full-blown" new system. That would be wasteful and would not benefit from or respect the multiple EM efforts underway and existing intellectual capital. Rather, ICD is intended to leverage existing programs to the maximum extent; then serve as a focal point and provide direction to the many programs and systems sprouting up throughout the country. ICD is thus an "umbrella" coordinating framework. ICD will help create new institutions and new functionality where they are needed – like in the Neighborhood Network Building and Mitigation Operations Center – to fill the major gaps in our current EM and Homeland Security Systems.

This discussion brings us to the core question: Why is an overall coordinating framework – the end-to-end solution platform – needed, and why is it valuable?

Figure 3-1 makes the point that our current national "system" of Emergency Management really consists of a variety of "Point Solutions" that are weakly interconnected, if at all. The Point Solutions are all well motivated, directed at specific "symptoms" of underperformance, Thus, we have a variety of initiatives to: Achieve better First Responder Communications; provide better/faster public alerts; marshall volunteers in a variety of Homeland Defense activities; achieve scientific/technical interchange and input; and so on. **However, experience in the business world and in government policy shows that weakly-connected actions in a highly interlinked real world system commonly lead to disappointing results that are less than the "sum of the parts"; and sometimes, even to outright failure or emergence of new or worsened problems.**

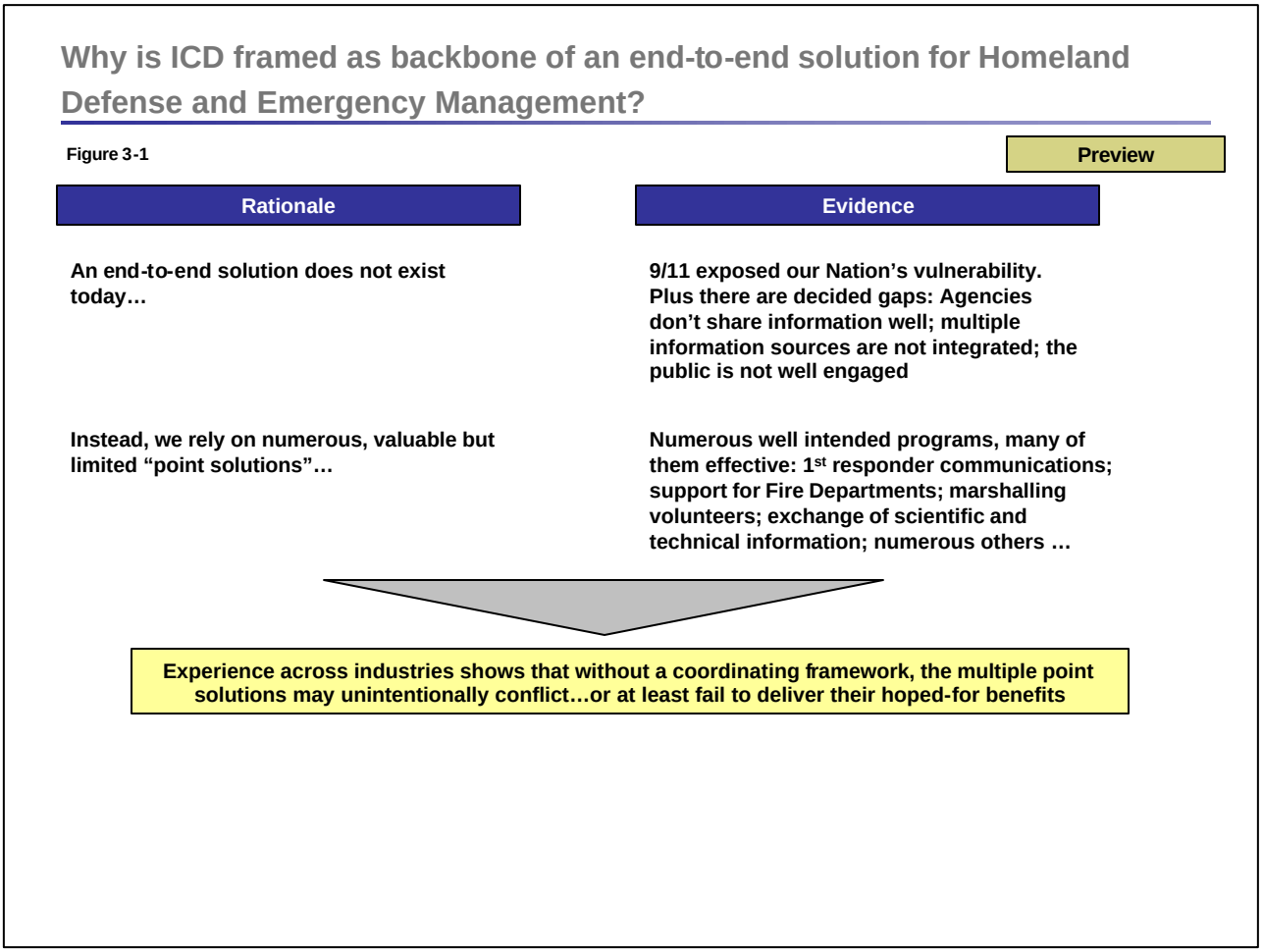


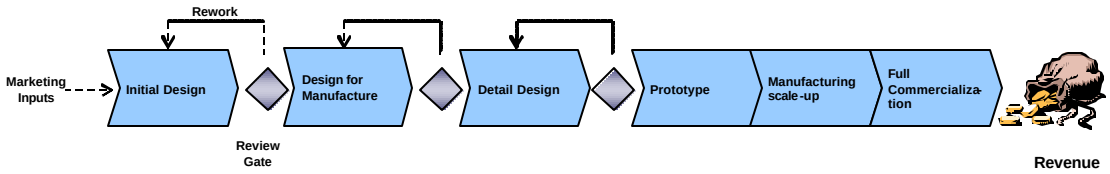
Figure 3-2 presents a business example, adapted from a real high tech manufacturer. The system portrayed in Figure 3-2 is a product development chain. It starts with inputs from marketing and the marketplace, then goes through phases of Initial Design, Design for Manufacture (meaning, adapting the design so it can be produced efficiently), Detail Design, Prototype, Manufacturing Scale-up and eventually, full Commercialization. There are numerous formal "review gates" interspersed at critical review points, to help ensure product quality. This type of product development process is indeed very common – but also yields common problems. This particular company suffered from chronically-late product introductions plus recurring quality problems. In turn, late product commercializations reduced the prices that the company could charge – because its products were not seen as "fresh" or state of the art – and also impaired overall competitiveness and market share.

"Point Solutions" fail by triggering bottlenecks that escalate cost and diminish effectiveness

Figure 3-2

Disguised Example

An electronics manufacturer had the following (simplified) product development process:



Problems — **New products were lagging schedule and had subpar quality…plus, late products suffered lower prices vs. competition because they were not "fresh"**

Response — **Management evaluated numerous options, and began to take action…**

Source: Adapted from N.J. Mass and B. Berkson, "Going Slow to Go Fast," *McKinsey Quarterly*, 1995, Number 4

Management reviewed a variety of actions, and began to formulate options and take action.

Figure 3-3 summarizes the results of implementing one action: a formalized Scheduling Process designed to accelerate progress and focus resources on lagging steps. The logic was to improve product introduction performance through a more "disciplined" and focused process. But in fact, the next several products commercialized were even **later** to market than originally projected, and suffered severe quality problems.

Why did this occur? Tighter schedules indeed began to accelerate progress. But the resulting schedule pressure caused engineers to short-cut design for manufacture and test quality (Result 1). More rework was one by-product (Result 2). Also, prototypes were less stable (Result 3), which protracted manufacturing ramp-up. Finally, pulling engineers off other projects to fill gaps (Result 4) spread the problem across multiple product development programs. Lesson: Unintended consequences can undermine a localized strategy – unless the global consequences are fully thought out ahead of time.

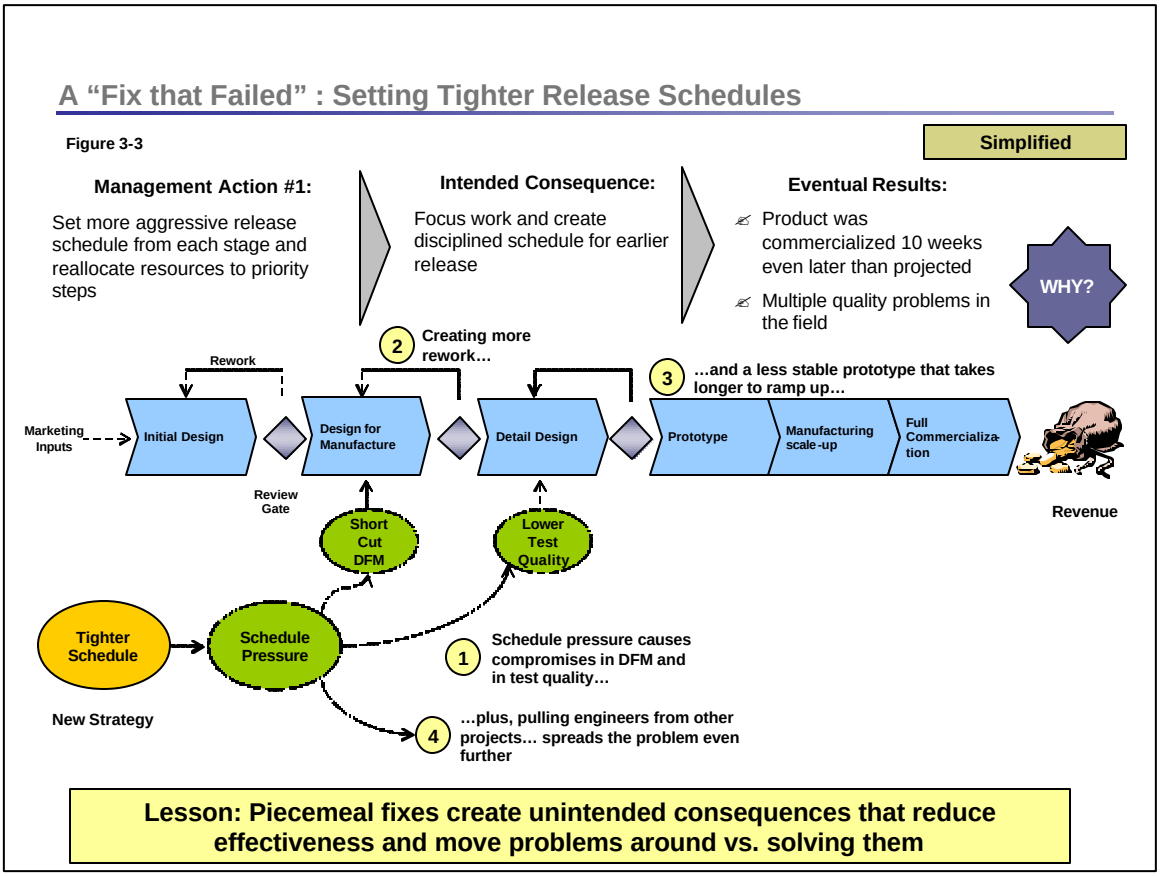
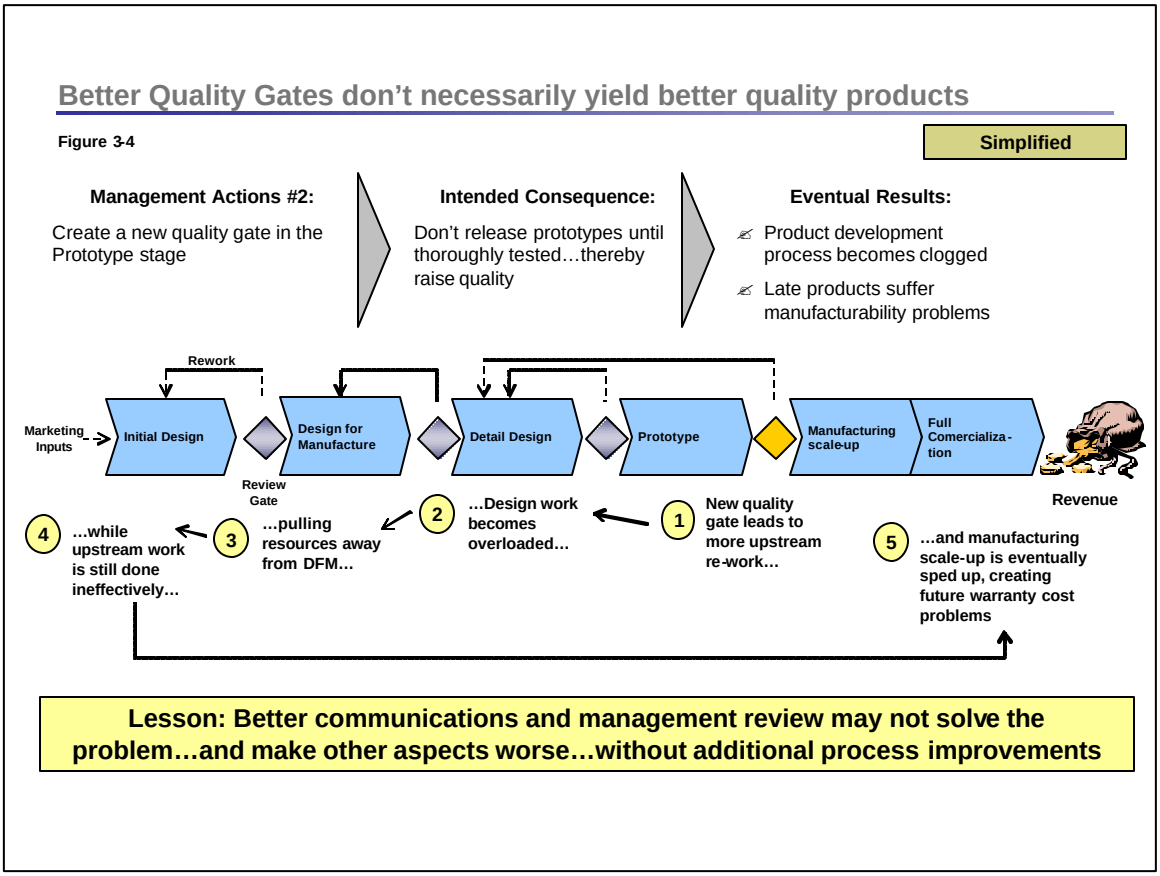
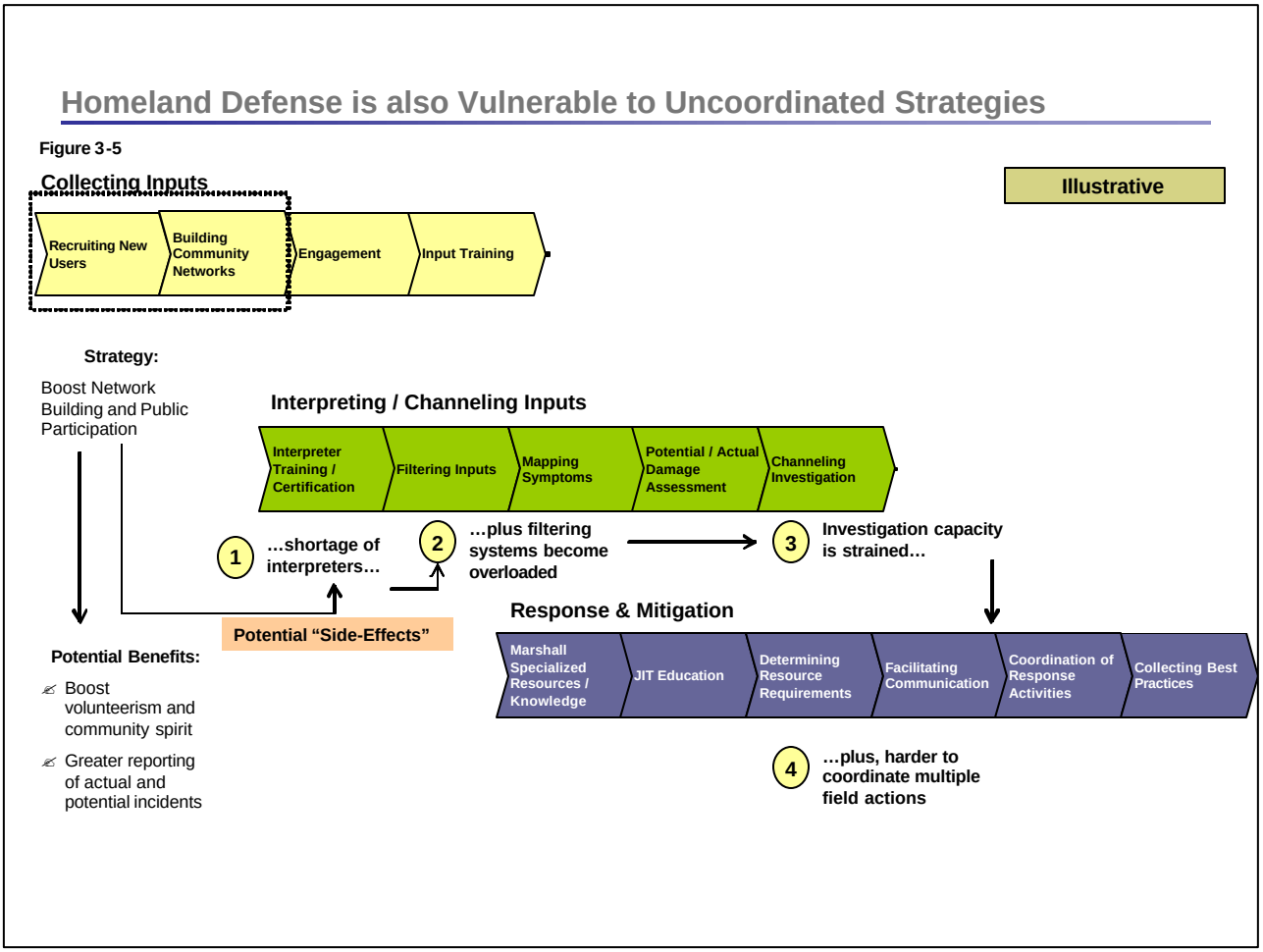


Figure 3-4 shows effects of another management action: Instituting a new quality gate in the prototype process, to ensure that prototypes meet standards. With this policy in effect, not only did the product development chain become clogged, but new products suffered manufacturing problems. Why? In fact, the new quality gate started to do its job – causing more rework into Detail Design (Result 1). But then the problems really started. Detail Design became overloaded (Result 2). Resources were pulled away from DFM (Result 3). Upstream work was still being done ineffectively – and was now starved for resources (Result 4). And attempts to speed manufacturing scale-up caused manufacturing problems (Result 5) that eventually escalated warranty costs once products got out into the field. In this example, better communications and tighter reviews – which probably sounded like "Motherhood and Apple Pie" in the management review meetings; hard to disagree with – in fact intensified problems that were just beneath the surface.



How do these results apply to Homeland Security and Emergency Management? Think about the variety of "point solutions" rife in the EM landscape, and how likely they are to achieve their goals.

For example, Figure 3-5 uses the ICD Value Chain to think through the effects of a concerted strategy to boost public participation, by itself. Public participation is also hard to argue against: Benefits include greater volunteerism and community participation; and greater reporting of actual and potential incidents. It's an important ingredient of a national strategy. But suppose those benefits begin to take hold … what next? In fact, skilled resources for filtering information and mapping symptoms would now be in short supply; analysis operations would become overloaded, as would investigation. Plus, multiple field actions would be harder to coordinate.



The greatest risk is that public participation would actually be undermined, as portrayed in Figure 3-6: Overloaded investigation capacity would yield lower quality follow-up; engender public disappointment; and come full circle to discourage public participation. Also, overloaded resources would tend to defer training, so that longer-term resources to respond to problems would actually be **lower** at the precise time when **more** are needed.

Thus, greater public participation by itself – with no complementary policy changes – may not be a sustainable strategy.

Further risk that public participation is discourage by multiple clogged channels

Figure 3-6

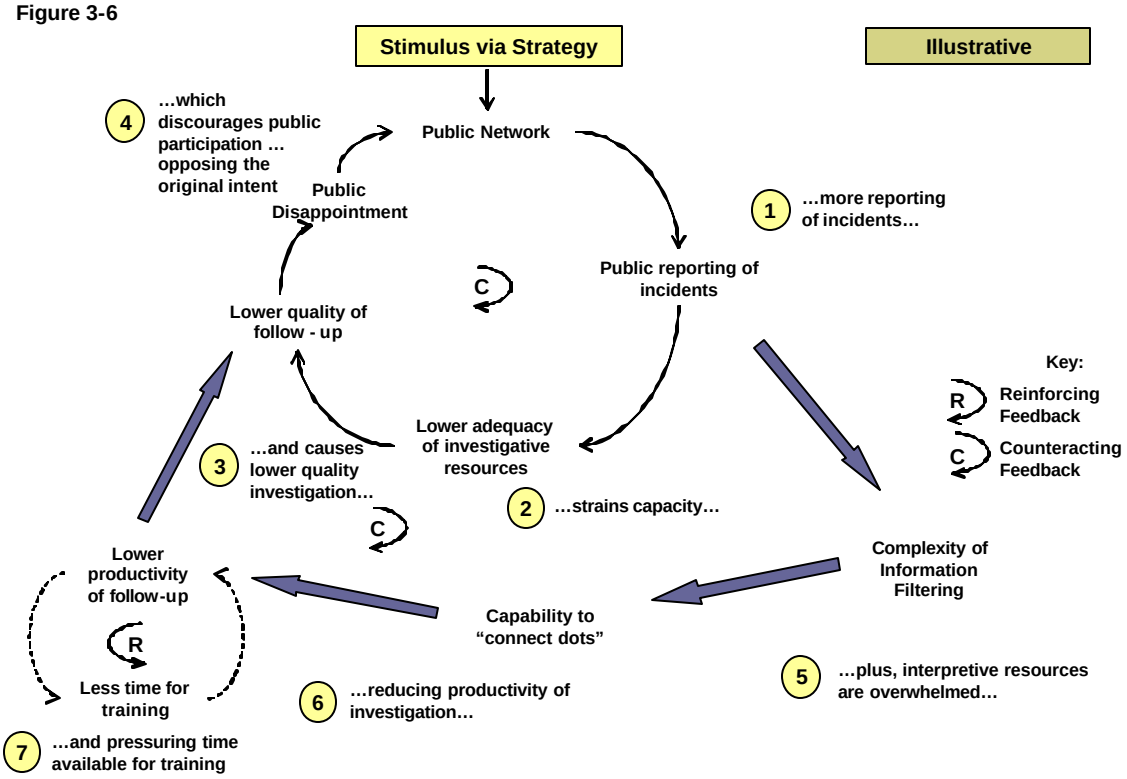
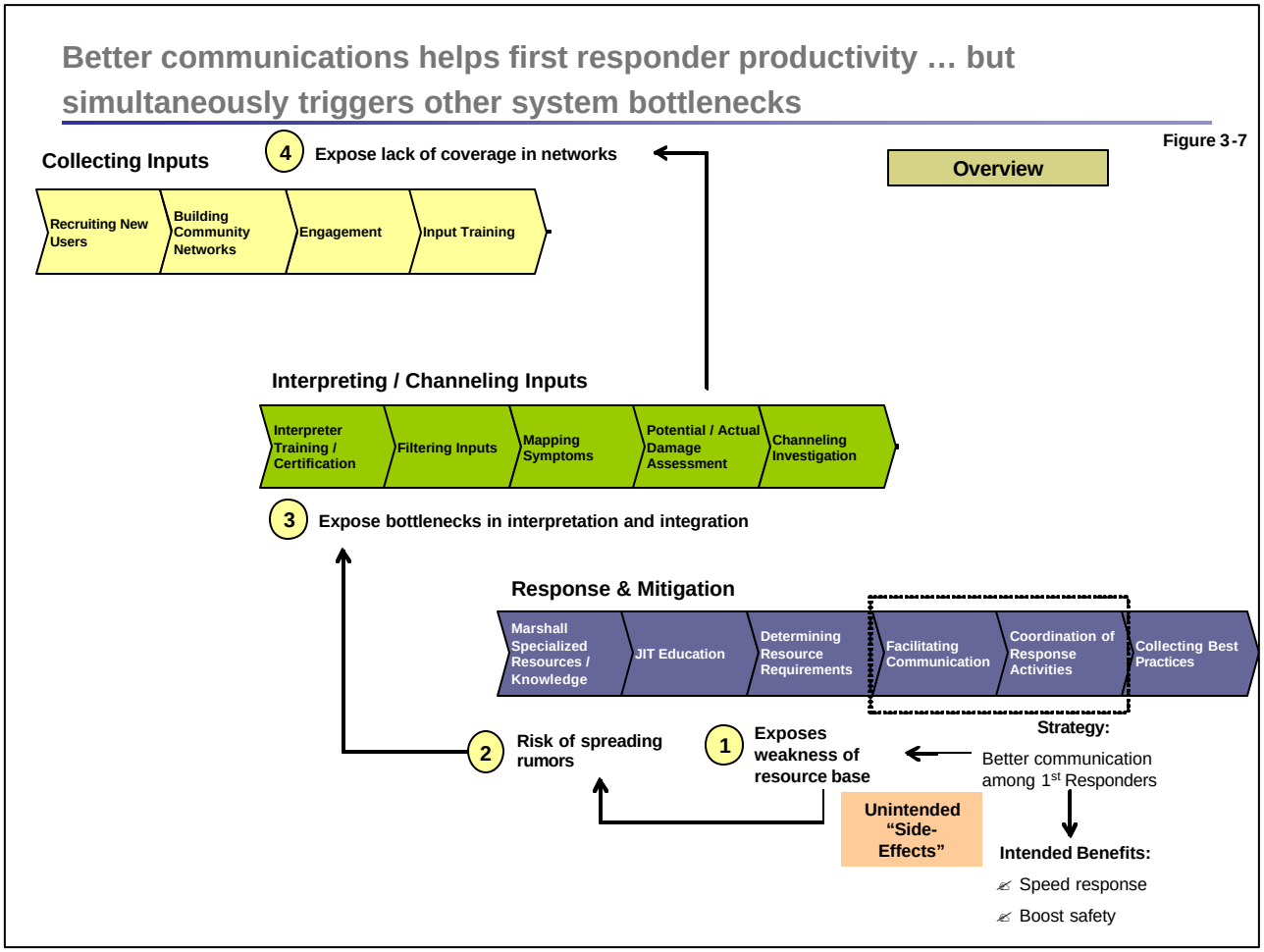
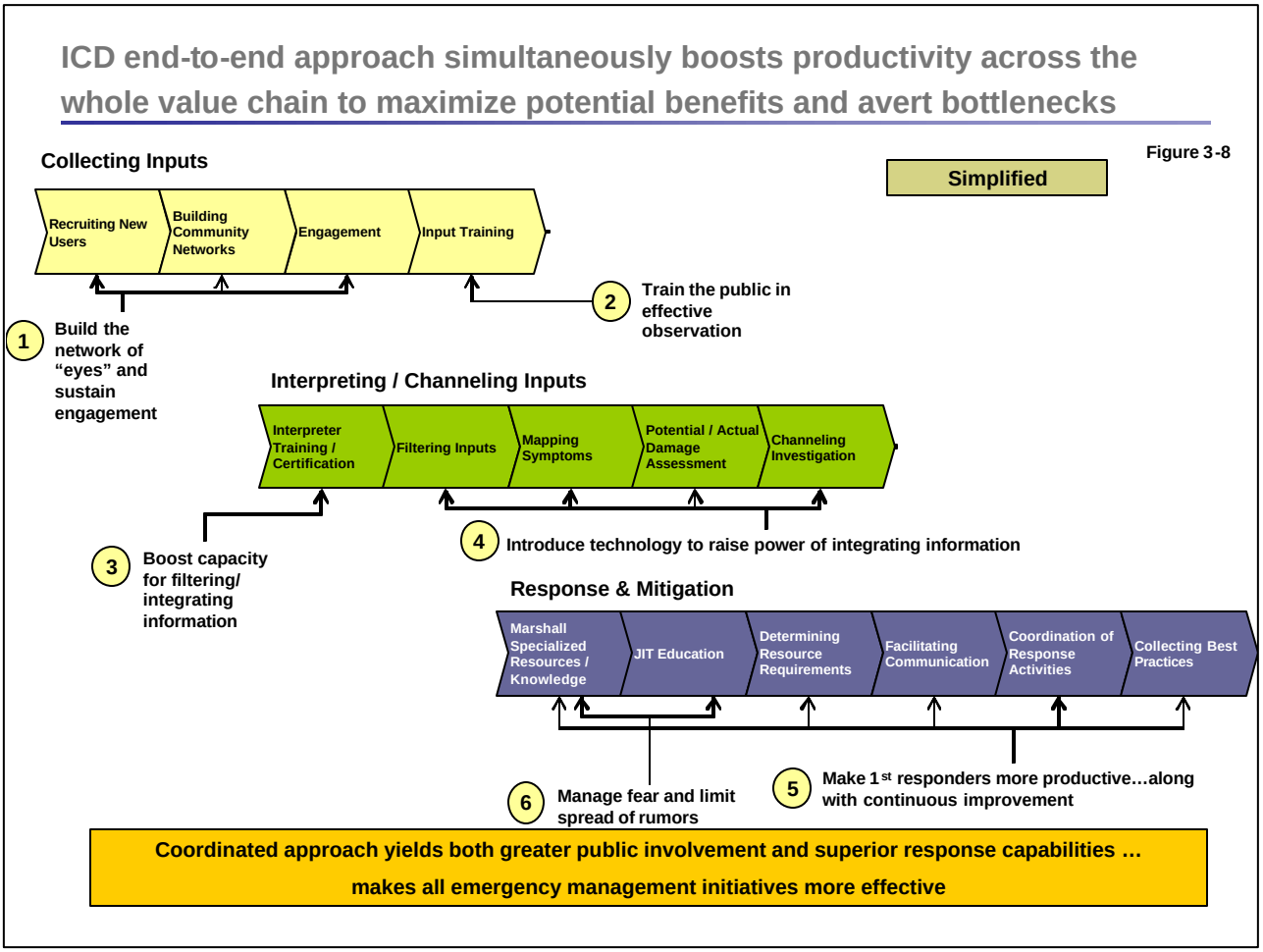


Figure 3-7 gives one final example, representing actions to improve communication among First Responders. There's no question that better communications are needed. But suppose that happened without any other parallel improvements. Better communications would expose weaknesses in the resource base to address problems; would risk greater spread of rumors; would expose deficiencies in interpreting information to guide response actions; and would expose the lack of coverage in key networks (such as office buildings). Net result: Benefits would probably be much less than expected.



Building on the above discussion, Figure 3-8 highlights the value of the ICD Integrated Approach. Not only are community networks strengthened (Result 1). But simultaneously, the public is trained to be more effective observers and to support mitigation operations (Result 2); capacity for filtering and synthesizing information is boosted (Result 3) and technology is brought to bear to detect patterns more readily (Result 4); First Responders become more productive (Result 5); and Fear Management helps minimize rumors and foster recovery and public confidence (Result 6). The coordinated approach makes all parts of the EM system more productive.



To use a manufacturing analogy, with weakly-coordinated actions, an improvement in one place – like public participation – triggers "bottlenecks" in other places – like investigation and response. In contrast, the coordinated approach simultaneously "de-bottlenecks" all the critical operations to raise the overall capability of the system, and the potential to serve National response needs.

The ICD end-to-end approach thus enables all EM initiatives to become both more effective and more responsive.

IV. Detailed Operations of Neighborhood Network Building

Creating a Cascading "Network of Networks"

Neighborhood Network Building will create multiple Neighbor-to-Neighbor (N2N) trusted networks, building up from the "grass roots" level. These N2N networks will channel information; foster neighborhood preparedness; and provide On-the-Ground Observer volunteers to support and inform mitigation operations.

Figure 4-1 shows that vibrant N2N networks, connected via the Internet, can collect and disseminate information for Mitigation operations and Fear Management, channeling that information both horizontally and vertically. Horizontal movement of information can keep neighbors apprised of status of emerging events, plus share education and preparedness materials. Vertical movement of information provides a vehicle to share and aggregate information across communities, then up to the City, State, and National levels. Information that is propagated upward must be filtered to remove "noise," and simultaneously extract key content – including trends and cross-cutting developments, such as potential contamination in water supplies affecting multiple communities.

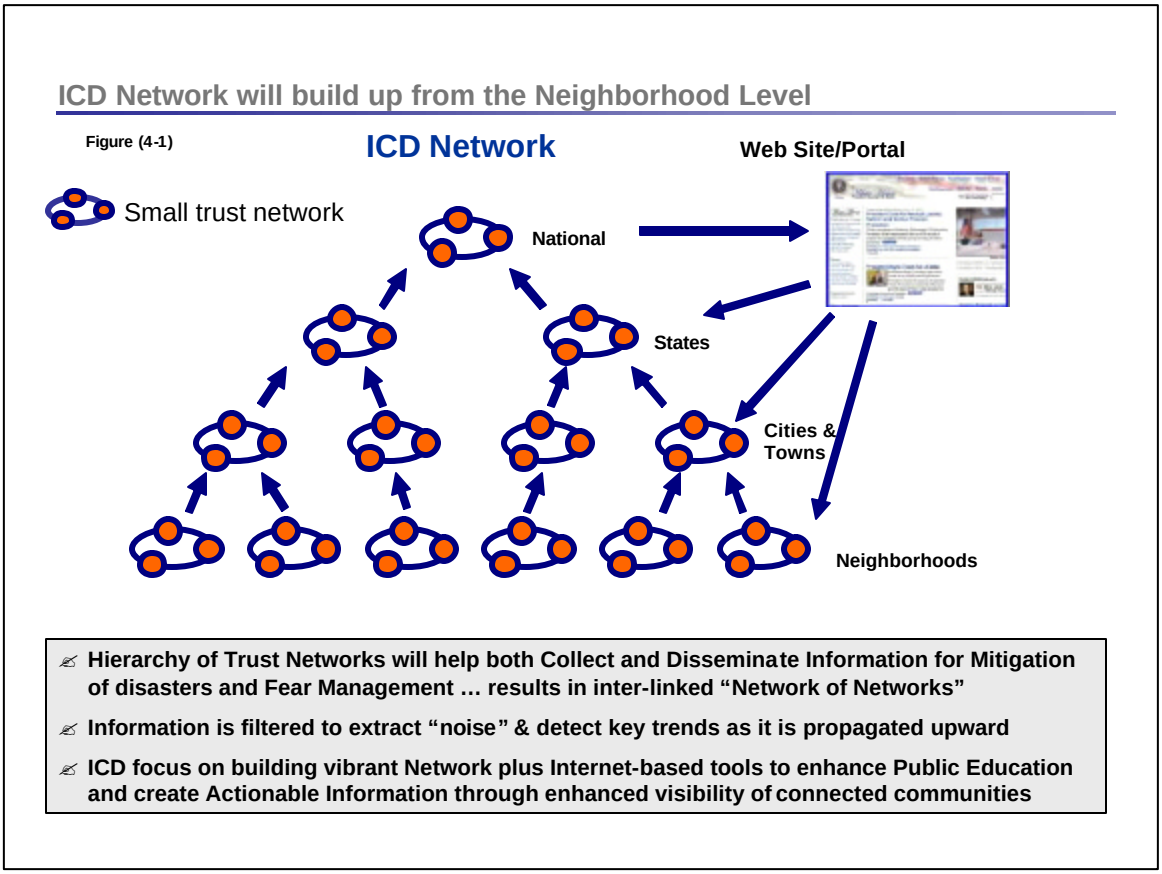
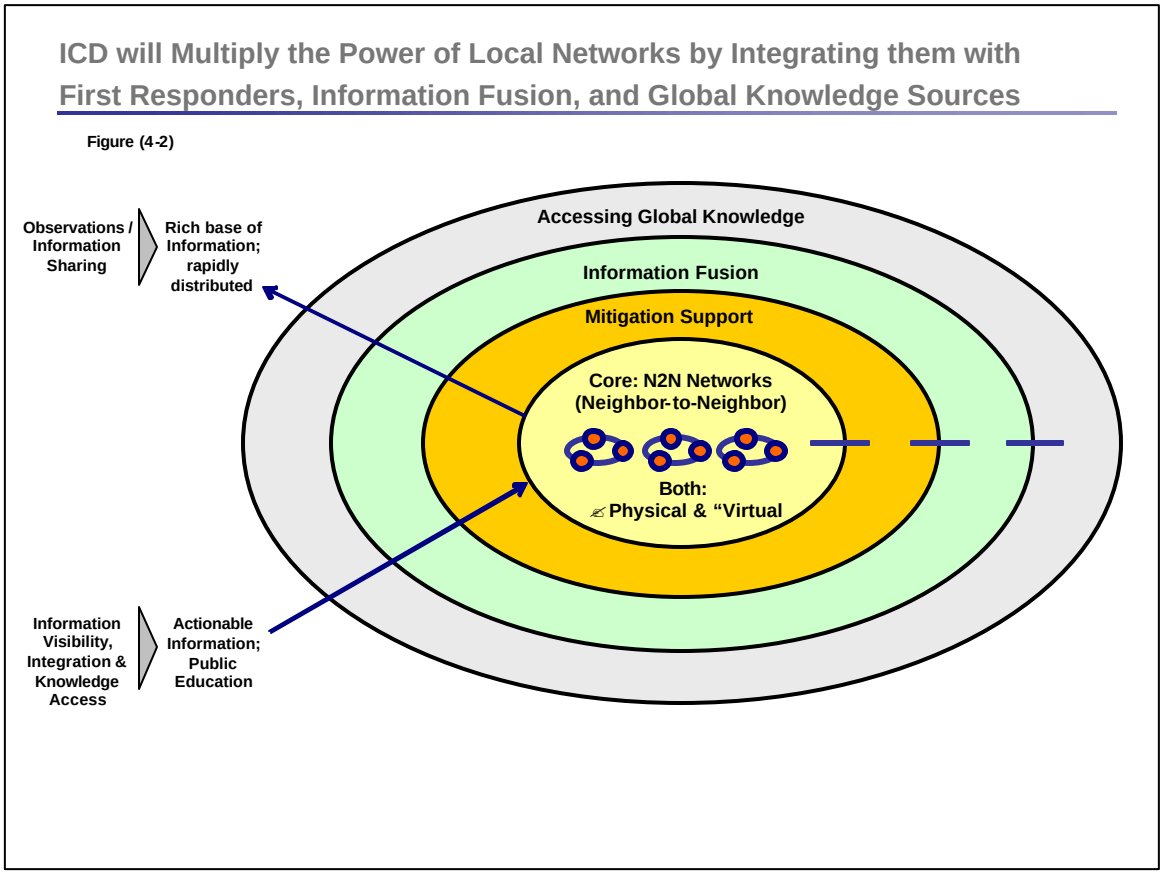
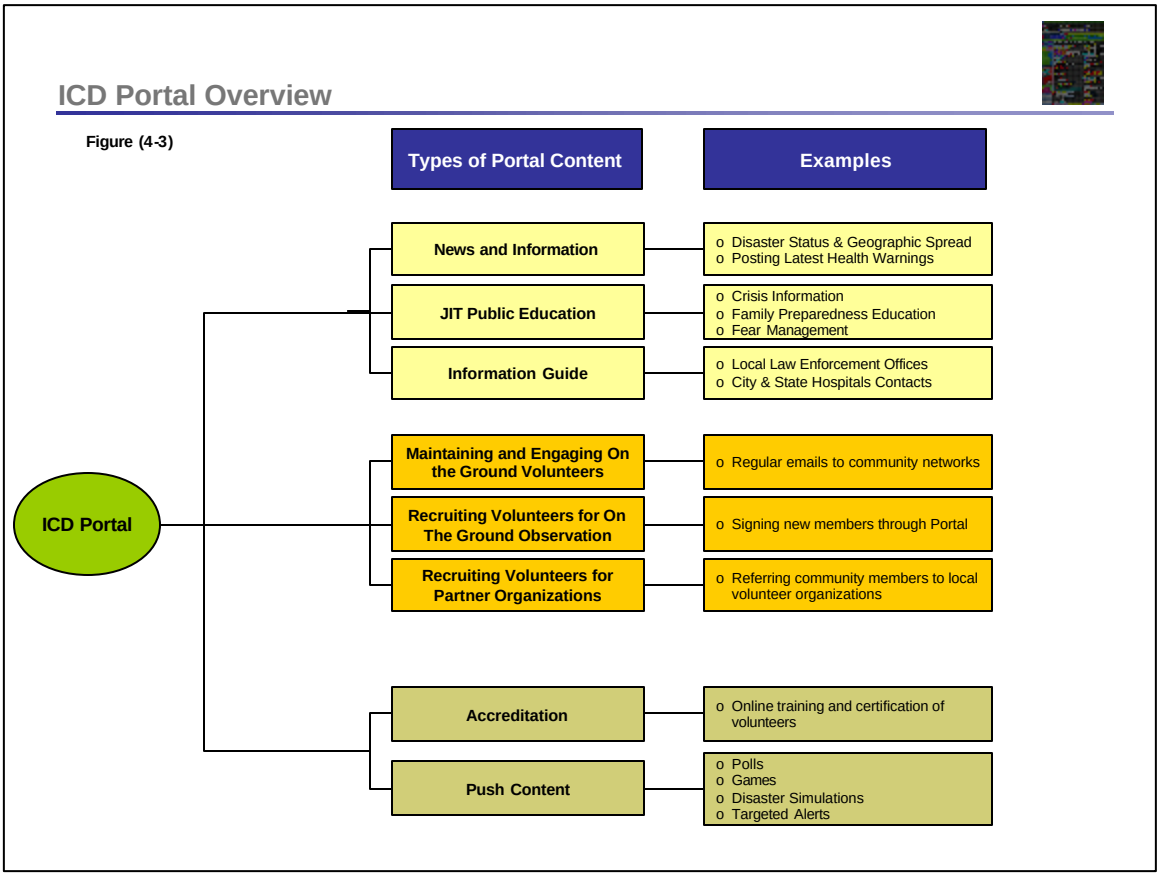


Figure 4-2 builds on this view. In the figure, N2N networks are the "core" of ICD, surrounded by concentric rings of Mitigation Support, Information Fusion, and Accessing Global Knowledge. The N2N networks are both "physical" – meaning the actual neighborhoods people live and work in; plus "virtual" communities – meaning working or interest groups united by common domain knowledge, such as Emergency Management associations, or Public Health experts. Information flowing out from the core will create a rich base of observations, distributed rapidly via the Internet. Broad sharing of information creates more powerful information visibility. Aggregating, filtering, and synthesizing that information converts what originated as discrete observations into **Actionable Information,** in turn guiding delivery of JIT Public Education materials.



Overview of Public Portal Functions

The Public Portal will be ICD's key "face" to the community networks and to the general public. Figure 4-3 portrays the multiple ways in which the public will use the Public Portal.



The Public Portal will serve a fundamental educational mission, both in "peacetime" to foster preparedness education and self-development; and during crisis, to provide reliable and actionable information. For example, preparedness education will build on the excellent materials for Family Preparedness Planning developed by ARC.

As part of the education mission, the Public Portal will contain an "Information Resource Guide" that will help individuals who detect an anomalous event report that to the proper local authorities. For example, an individual may type in their zip code and obtain a detailed contact list of public authorities. The Portal will be complemented by a Call Center to address public questions and help communities use the portal most effectively.

The Public Portal will also be a recruiting channel, to complement off-line recruiting (see Section VII for general of discussion of Recruiting to build the ICD network). The Portal will direct the public to volunteer opportunities with ICD Partner organizations, such as ARC, NW, or Citizen Corps. The Portal will also recruit individuals as On-the-Ground Volunteers and Coordinators for mitigation operations through the Mitigation Operations Center (see Section VI). The Portal will maintain active contact with these on-the-ground volunteers to get them active and engaged, including maintaining fully-current contact information. The On-the-Ground Coordinators will be trained to become catalysts in their neighborhoods, to create cohesive community networks involved in preparedness activities, and in turn, active users of ICD content and programs. Many individuals may

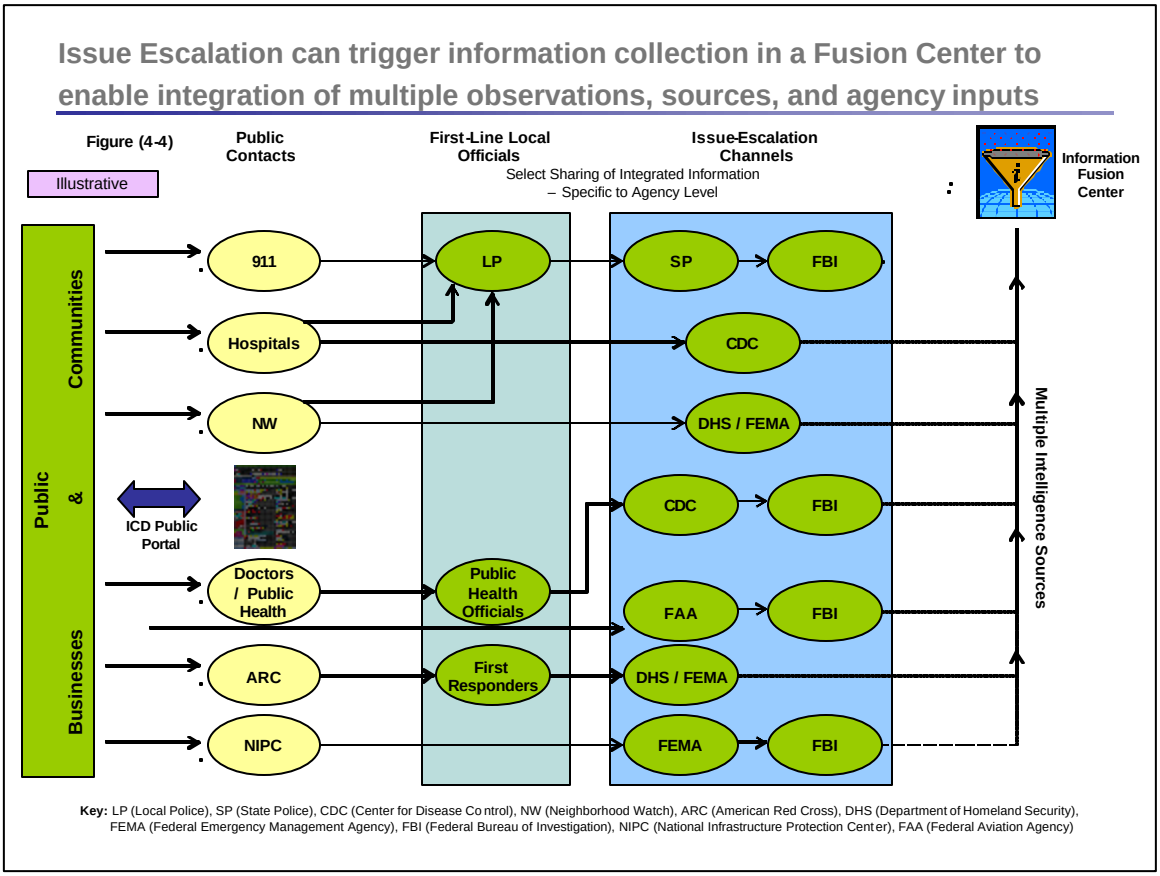
elect to volunteer both as on-the-ground observers and as volunteers for, say, NW or ARC, both because activities are complementary and time commitments will generally not overlap.

The Public Portal will also provide on-line accreditation for various training programs. On-the-Ground Coordinators will have one training curriculum – that will develop skills in community network building, fear management, and other topics. The general public, and the broad category of on-the-ground volunteers, may hone their observation and communication skills through another on-line training. Such training will help create more effective neighborhood citizens. ICD on-line training will benefit from, and leverage, the skills of ARC in certification and accreditation. Delivery of on-line training will make the ICD system highly scalable to expand the volunteer and participants networks over time.

Finally, as discussed later, the Public Portal will offer "dynamic content" that can be "pushed out" to portal users to enable them to use various tools in their families or communities: Preparedness templates; polls; games or disaster simulations; etc.

Channeling Public Information

Figure 4-4 shows how the Public Portal Information Guide will refer individuals to public authorities, and how the resulting information may eventually make its way into the Information Fusion Center.



People may call into the Public Portal Call Center, or use the Portal Information Guide directly, when they are unsure what public authorities to contact. Thus, a teacher who observes that several of his/her students have been ill; or a citizen who sees an oil drum in a local water supply, or a dead crow in his back yard, may access the Public Portal. The Public Portal will refer citizens to the proper authorities, plus give them valuable information and educational materials that bear on their queries (e.g. on West Nile, or on bio-terrorism, or other topics), but will not directly take in any citizen information.

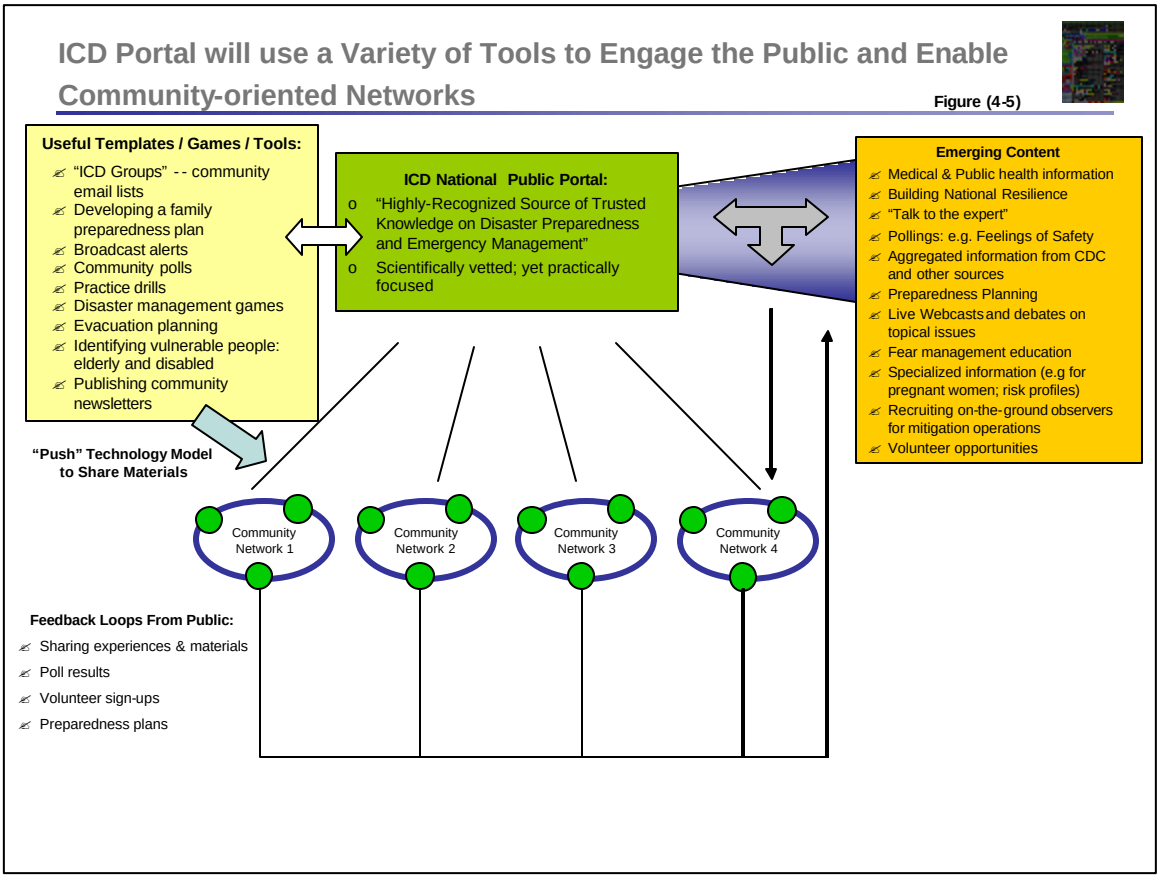
In the figure, people then contact their local authorities, which launches the investigative process. Figure 4-4 does not attempt to show all possible connections, but illustrates some common channels. For example, an individual may call 911 and be referred to the Local Police. In this example, the Police represent the first-line public officials who investigate. If that investigation is escalated to State Police or to the FBI, then information will be transmitted to the Information Fusion Center (IFC), where it becomes available for broader information sharing and analysis.

Alternatively, a citizen who is a member of NW may observe a strange truck in the neighborhood and launch an inquiry through the Local Police. Or an individual who visits a local doctor or hospital may yield information that gets transmitted to the CDC and then on to other public officials, such as the FBI. Whatever the channel of origin, the principles illustrated in the figure are: (1) the Public Portal refers people to local

authorities; it doesn't take in information per se; and (2) once local-level investigation confirms a need for follow-up, defined escalation protocols will result in information sharing into the IFC, to help trigger broader investigation and deeper, integrating analysis that cuts across geographies and original information sources.

How ICD will Engage the Public

Figure 4-5 presents the aspiration of the Public Portal to be a "Highly-Recognized Source of Trusted Knowledge on Disaster Preparedness and Emergency Management." ICD information will be scientifically sourced and validated; yet will be highly practical and actionable for citizens. This is the hallmark that ICD must achieve, working in concert with ARC, FEMA and other potential partners in the Public Portal.



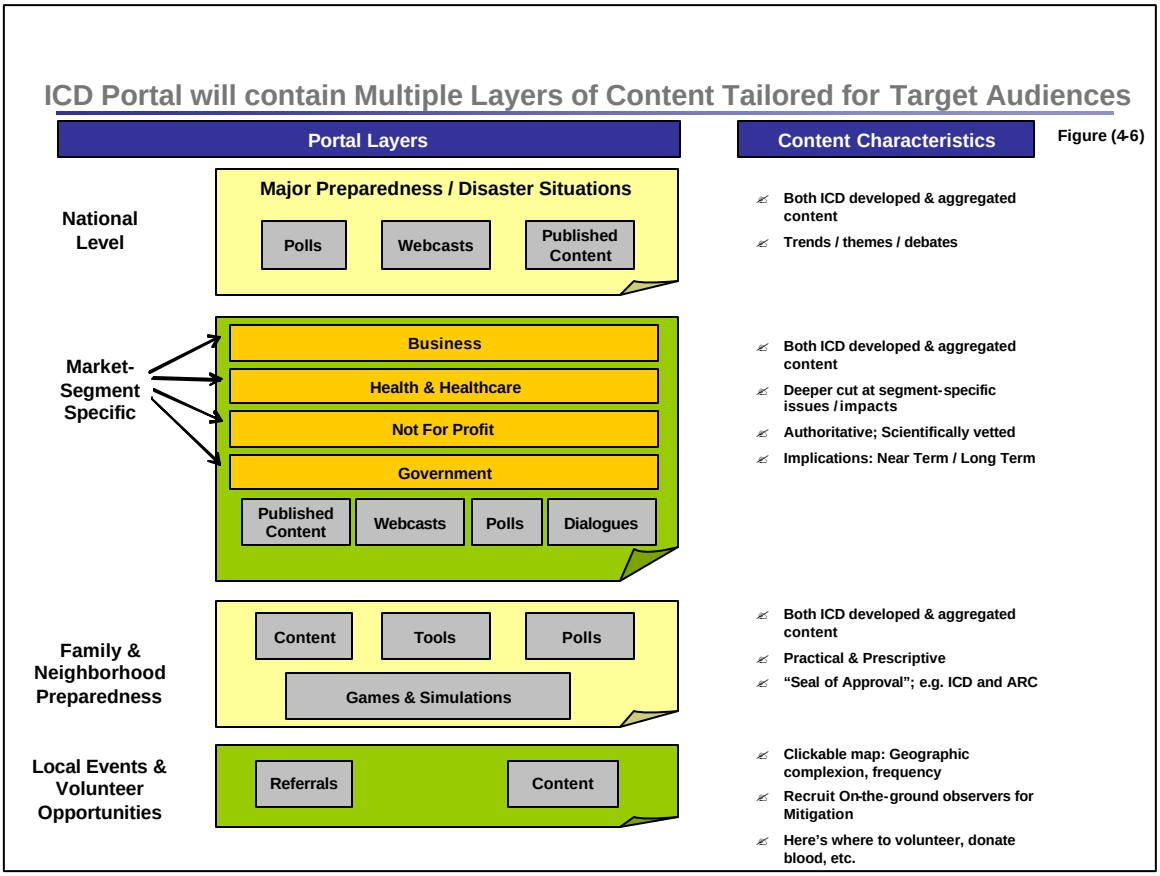
At the top right of Figure 4-5, published content will be rich, spanning topics such as Medical and Public Health information; Achieving National Resilience (see Appendix 2 for discussion of Resilience Strategies); and Preparedness Planning. Beyond that, ICD will sponsor live events such as "Talk to the Expert" which will enable citizens to interact with and ask questions of authorities on public health and safety, bio-terrorism, volunteerism, economics, and other subjects. Live webcasts may be used to communicate information in an engaging medium, including debates on topics such as: Should the nation simulate production of and stockpile antibiotics; or, How to prepare for potential

outbreak of biological agents?; or, What are the long-term health effects of 9/11?; or, What are the Economic Impacts of Terrorism and Natural Disasters.

At the top left of Figure 4-5, the Public Portal will provide a variety of templates, tools, and games that can be "pushed down" to communities for them to use. For example, a national poll could be run on feelings of safety; then that same poll could be provided for citizens to use in their communities; then share back the results, completing the "feedback loop." Also, the Public Portal could provide a vehicle for individuals to collect community e-mail rosters, creating "ICD Groups" that can better stay in touch (analogous to the group lists on Yahoo! and some other high-usage portals). Communities could eventually publish community newsletters through local arms of the Public Portals. Disaster simulations or preparedness Games could be made available to families and teachers. During a crisis, the Public Portal would help to inform and involve a broad base of ICD users in mitigation support (see Section VI).

The ICD content will undoubtedly improve and evolve over time. However, Figure 4-5 portrays a philosophy and approach to providing useful tools and information that help to form and sustain community networks to strengthen the underlying communities and make them better prepared to cope with emergencies. ICD will also provide a variety of community volunteer opportunities, with easy on-line sign up.

Figure 4-6 shows four "slices" of potential ICD content. The highest level would be national-level news and interpretation on actual and potential disaster situations. That content could be delivered in published form or via webcasts, or via dynamic polling. ICD would partner with major media providers (such as CNN and others) to obtain portions of this content.



The next level down would be market-segment specific information, targeted at Business; Health and Healthcare; Not-for-Profits; and Government. In each case, content would be delivered in a variety of forms, and ICD would both develop unique content, plus distribute content from existing expert sources, such as CDC, FEMA, ARC, or National Infrastructure Protection Center (NIPC).

The third level down is Family & Neighborhood Preparedness. Information at this level will be both practical and prescriptive – but with sound scientific foundations. Over time the "seal of approval" on these materials from ICD, ARC and other trusted organizations will distinguish ICD as a trusted provider of high-value information.

Fourth, the Public Portal will feature local events related to preparedness and emergency management, plus local volunteer opportunities. Another ICD hallmark will be to leverage technology to deliver valuable content and real-time information to the public. For example, ICD could use technologies such as MITRE's GeoNode system (Geospatial News on Demand Environment, originally funded by DARPA; see Section VIII on Technology Enablers) to provide a clickable map of the U.S. (or of the world), and have users scan potential "hot spots," including developments that could impinge on their communities. This example shows how ICD can combine "high tech and high touch." The objective is to build strong community networks by empowering them with knowledge and with information technology.

Working with ICD Partner Organizations

Figure 4-7 shows how ICD "co-branding" with potential partners could help to create and disseminate valuable content; expand the relevant volunteer networks for all partners; and aggregate efforts to foster safer communities; all without compromising the individual identities and operations of the partner organizations.

Co-Branding ICD with Other Organizations can Significantly Increase ICD Presence, Reach and Publicity

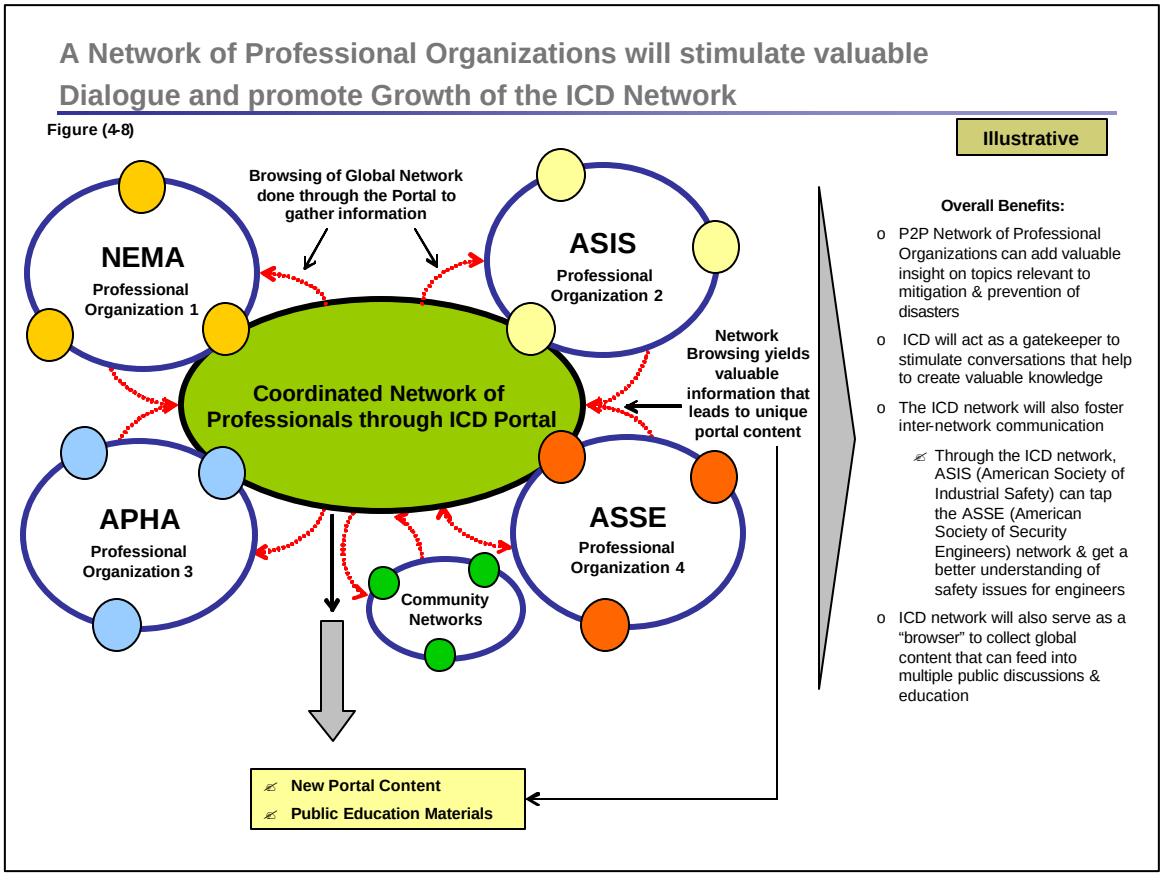
Figure (4-7)

Potential Partner Organization	Co-Branding Activities & Benefits
American Red Cross	✍ Co-Development of public education materials on disaster & family planning ✍ Expanded mission in Public Education and emergency preparedness response ✍ Recruit new ARC Volunteers on ICD Public Portal
FEMA.gov	✍ Increased public awareness of FEMA initiatives ✍ Enhanced leadership role in facilitating response activities during disasters ✍ Create pivotal role for FEMA within DHS
citizen corps	✍ ICD becomes a referral source for new Citizen Corps volunteers ✍ Co-development of community improvement & education activities in low-income neighborhoods
National Neighborhood Watch	✍ Increase member awareness & engagement in protecting the community ✍ ICD refers potential community members to local block captains and to National NW ✍ NW & ICD joint develop Neighborhood Watch kits for new neighborhoods currently without a NW program
WHO	✍ Ability to monitor and quantify developing health trends ✍ Share content emerging from Global Experts Network
CDC SAFER • HEALTHIER • PEOPLE™	✍ Publish CDC content on ICD Public portal ✍ Ability to monitor and quantify developing health trends ✍ ICD & CDC develop educational materials related to current health concerns (e.g. West Nile)

ICD will need to create strong partner relationships that reach out to communities via off-line speaking opportunities and recruiting, to complement on-line communications and interactions via the Public Portal. Combining efforts with partner organizations can help to multiply community networks; and make them stronger, more active, and more knowledgeable. ICD recruiting can initiate a "train-the-trainer" approach to amplify the field recruiting force, and thereby achieve broader coverage, plus lower cost per new user/volunteer. Getting new users on to the ICD Public Portal and then encouraging both spread via word of mouth and new volunteer growth, are crucial to building the ICD network.

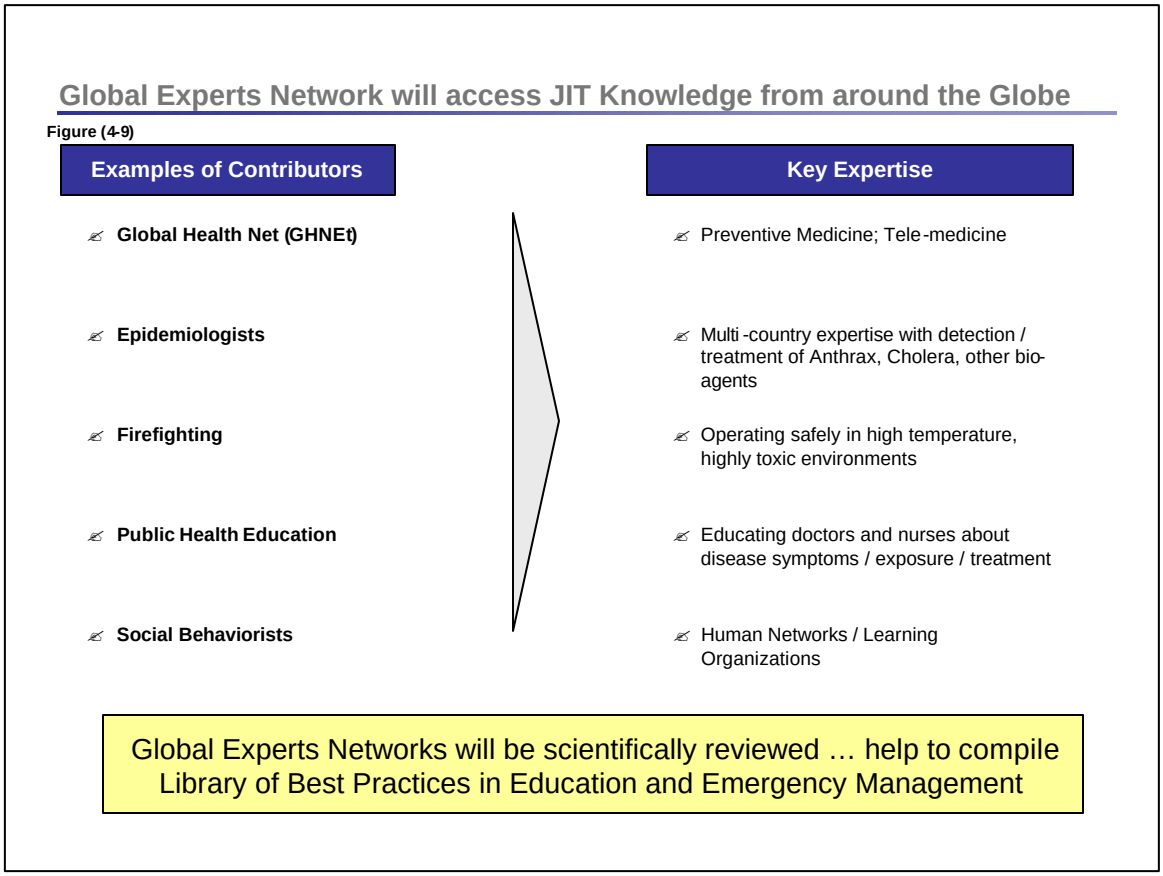
Some of the natural ICD partner organizations are professional associations with interests in industrial safety, emergency management, public health, and related disciplines. Figure 4-8 shows how ICD aspires to function as a "gatekeeper" to encourage multiple dialogues

across and connecting the various professional groups and the public to foster new content, new knowledge creation, and active sharing of knowledge. Community networks – individuals, business, state governments, etc. -- can tap into these professional groups to learn a variety of information and techniques. ICD would also function as a "browser" to search out global information that can enrich ongoing dialogues.



As mentioned earlier, ICD will also organize a Global Experts Network that will become an important contributor to the peer-to-peer (P2P) discussions in Figure 4-8. Figure 4-9 illustrates the breadth of information sources and expertise that may constitute the Global Experts network. For example, the Global Experts Network will build on Global Health Net (GHNet), which now spans 10,000 professionals in 140 countries, sharing leading-edge information on preventive medicine and preventive tele-medicine. Beyond that, the Global Experts Network will provide expertise on firefighting, epidemiology, public health education, social network building, learning organizations, grief management, and other key topics, to provide JIT knowledge in support of mitigation operations and public education. The Global Experts Network will be scientifically reviewed, to ascertain reliable, practical, and authoritative information that can command the public trust. The specific content areas will be shaped over time to meet evolving education and mitigation needs. However, a key point to emphasize, is that society can have the benefit of such high-value, JIT knowledge in time of crisis, only if the Experts Network is build up on a continuing basis and before it is specifically needed, especially during "peace time."

Section VI extends this discussion to show how ICD-fostered Neighbor-to Neighbor (N2N) networks can create rich neighborhood-level communications and simultaneously support mitigation operations centered on those neighborhoods.



Fear Management

In 2002, we published an article titled the **"Epidemiology of Fear" (1)** in a leading medical journal, the Lancet. The article makes the case that terrorism is different than war. In war, the primary goal is geographic gain with the massive killing of people. In contrast, the goal of terrorism is not killing people per se; rather it is striking fear into peoples' hearts, so that the terrorists can get their message heard and the public becomes paralyzed. Thus, the focus of terrorism is the epidemiology of fear.

9/11 extracted a terrible toll in terms of loss of life. However, the threat of terrorism has also fostered a warped perception of risk. For example, bioterrorism in the year 2001 killed 7 people. In contrast 1000s of more people were killed crossing the street, or by lightning, than those killed by anthrax. However, the terrorists were able to inject fright in our country; a crippling type of fear that sustains their message.

Dr. Robert DeMartino, who directs the Program on Trauma and Terrorism at the Department of Health and Human Services makes the striking observation that for every person who gets physically ill from a bioterrorist attack, there probably will be at least 50 to 100 who are so distraught that they cannot function normally in their daily lives. He concludes: "'Terrorism only wins if you respond to it the way the terrorist wants you to …the power is in your hands."

Terrorism will also win if the public moves over time from patriotism and civic works to one of apathy or fear. Should this happen, our guard will slip, and the U.S. will be vulnerable to further terrorist acts.

How can we best manage fear? A useful approach to the epidemiology of fear is a mix between: (1) the fear management approach of Project East River, the outline for national civil defense prepared in the 1950s; and (2) Robert Putnam's approach to the American Community in "Bowling Alone." Combining these building blocks, and bringing them onto the Internet, provides a powerful approach to fear management, leveraging both education and community sharing of information.

Project East River: This study recognized early that prevention and control of fear and panic are critical to the health and safety of the US when under attack. As presented: "more death and injury may occur from that cause than from the direct effects of military weapons".

The study also recognized that it is difficult to predict the outcome of fear. The occurrence of fear is commonplace and much of it justifiable; but panic is rare. However, there are certain risk factors for a "group panic." **Verification of danger** is the first step in diagnosing real, vs. imagined, dangers. Is there really a danger, and what is the threat? Fear Mitigation provides the data.

The verification of danger step involves bringing facts, dialogue, and information to bear, to assess whether or not there is a danger, and if so, how severe. Frequently, more facts can help correct misperception of danger. Therefore, ICD involvement at a neighborhood level can bring the perception of danger closer in line with true dangers by creating strong information links – both within the community, and through outreach beyond the immediate neighborhood, including accessing reliable sources of information.

If fear bubbles up, panic can ensue, but this is unusual. As defined in Project East River: "Panic is highly excited individual or group behavior characterized by aimless unorganized unreasoning, non-constructive activity. It results ordinarily from sudden, extreme … fear".

Panic is like a chain reaction. If individuals see others in panic, and these individuals do not have a grounding of fact, panic can occur. Infusing the community with accurate information is a primary means to reduce the likelihood of panic, and to mitigate fear. Fear will not be eliminated, but it can be controlled.

Fear and panic emerge when individuals find themselves confronted with perceived serious danger. Project East River indicated that there were certain behaviors that needed to be organized, in order to reduce the perceived danger and hence fear:

A. The danger triggers useful behaviors learned through previous training, e.g. delivered by EMTs or firepersons
B. There are guidelines available for those who are not trained, to prompt reaction in an organized manner
C. Even if the individual is not trained or does not have guidelines, an adaptive response takes place to mitigate danger and fear

Fear/Panic Prevention Measures therefore include:

A. Training/Education
B. External Directions at the time of Emergency
C. Internalized Knowledge to leverage personal insight/experience in a new situation

Using these measures helps to control fear at two levels: (1) Avoiding exaggerated Fear, to avoid dysfunctional personal behavior; and (2) Preventing frustration that leads to dysfunctional Organized/Group Behavior such as mob behavior, raising havoc on our citizenry.

While Project East River is a bit dated, it is still one of the few discussions of a National Attack, and the fear which this could engender at the personal level, at the community level and at the national level.

Robert Putnam and Building "Social Capital": We can look at fear management from more recent eyes, that of Robert Putnam, and his classic book "Bowling Alone," published in 2000. Putnam attributes fear to absence of social links. The more social links we have, the less likely we are to suffer major fear and panic. Social links are not only "social," meaning fraternal; but they also transfer knowledge.

For example, suppose I am alone in my community, and I hear on the radio about an anthrax attack. Without a social network, I have no means to confirm or deny this report. Verification of facts is impossible; I am left only to my imagination.

With a social network, I can contact 1, 2, ---15 people to see what they think, and I can then bring my risk perceptions closer to reality. In addition, I can bring my fear and panic reactions closer to the actual risk to myself, and to my family.

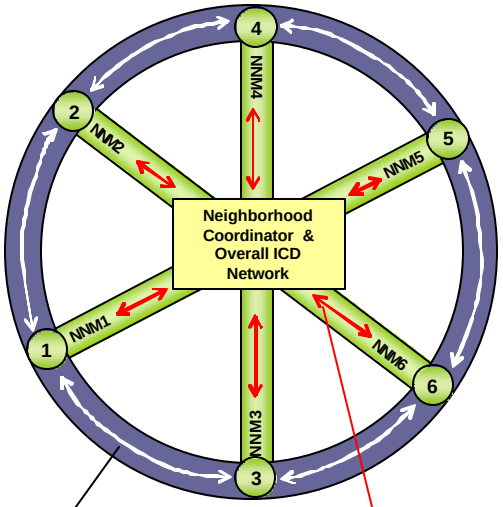
The Internet is a powerful new way to create such social links, and thereby build what Putnam calls "social capital." As presented in Figure 4-10, the ICD Network can help each community in the U.S. establish a "wagon wheel" type of connection with strong horizontal and vertical information links. Horizontal links connect each person in the community network, seen at the spokes of the wagon wheel. Vertical links connect each spoke to the Neighborhood Coordinator, plus to the overall ICD Network, at the center of

the wheel. Should an event occur, we are then able to leverage the eyes and minds of our neighbors to help shape actual risk perceptions in the community. In addition, we will be better able to transmit actual events and knowledge to the community.

The "Internet Wagon Wheels" form the backbone of accurate information sharing during the time of an emergency.

Wagon Wheel Structure of Neighborhood Networks Provides Information and Dialogue to Manage Fear

Figure (4-10)



Neighborhood Networks Multiply the Reach of ICD:

- Neighborhood Network structure will resemble that of a wagon wheel with the Neighborhood Coordinator & ICD Network at the Core
- The Neighborhood Network Members (NNM) are at the "spokes" of the wheel; these may be members of an actual physical neighborhood, or a virtual group
- Information will flow both horizontally across NNM; and vertically to the NNM through the Neighborhood Coordinator, or directly from the ICD Network
- Neighborhood Coordinator will act as a focal point for information distribution to manage fear
- Urgent communication to the NNMs can be done through the Neighborhood Coordinator, or directly via push-down e-mails to localized "ICD Groups"

Communication among NNMs can be in a variety of forms: email, telephone, physical visits, instant messaging

Communication to and from NNMs can include calls / emails to the neighborhood coordinator, or emails to the ICD group

The ICD system will serve as a training mechanism to build the organized behaviors needed at the time of crisis. In addition, the system will provide guidelines for neighborhoods on the optimal behaviors to bring people through a crisis. Guidelines will also help to deal with ambiguities.

Previous crises have suffered from what Project East River calls "Vacuum of Direction." Such vacuum needs to be filled quickly, and the Internet is an ideal channel for resolution. For example, it is important for groups to have a leader. ICD will help institutionalize neighborhood leaders to guide the community through any disaster. ICD will also infuse knowledge and education to instill and reinforce leadership-oriented behavior within multiple individuals.

As discussed above, fear leads to rumors. Once an event occurs, rumors begin to fly, most of which are inaccurate. Scapegoating and rioting are further dangers. Americans

are most certainly a law-abiding citizenry. However, if we were to be attacked by a certain ethnic or racial group, innocent people of the same ethnic background in the US might be at risk. Having an Internet civil defense would help to diffuse such backlash, as rules of conduct would be available, plus rapid identification of responsible individuals.

Rumors, surprisingly, need not be bad; and spread of some "rumors" should be encouraged. Suppose a fire occurred in your neighborhood. A "rumor" could rapidly circulate that the gas wells in backyards are dangerous, and the whole neighborhood could then quickly avoid the dangers. From this standpoint, neighborhood networks should promote rapid diffusion of accurate information; and quell spread of false rumors that induce fear.

Summary: Internet Civil Defense can help to manage fear in various ways. We can continuously poll people in communities to determine their fear level. Having N2N communications in a wagon wheel configuration for sharing information will allow neighbors to comfort neighbors; neighbors to have training with neighbors; and neighbors to share the best available information about the event.

It is important to recognize that society will never have full control of a "terrorist act" – although our deterrence systems can and should become more effective over time. But it is in our power at the level of the individual and the community to choose our response to a terrorist act, and thereby shape more constructive collective responses that substantially limit the net societal damage created by terrorism. So too, better-informed responses to a natural disaster can contribute to a safer, more resilient society.

References:

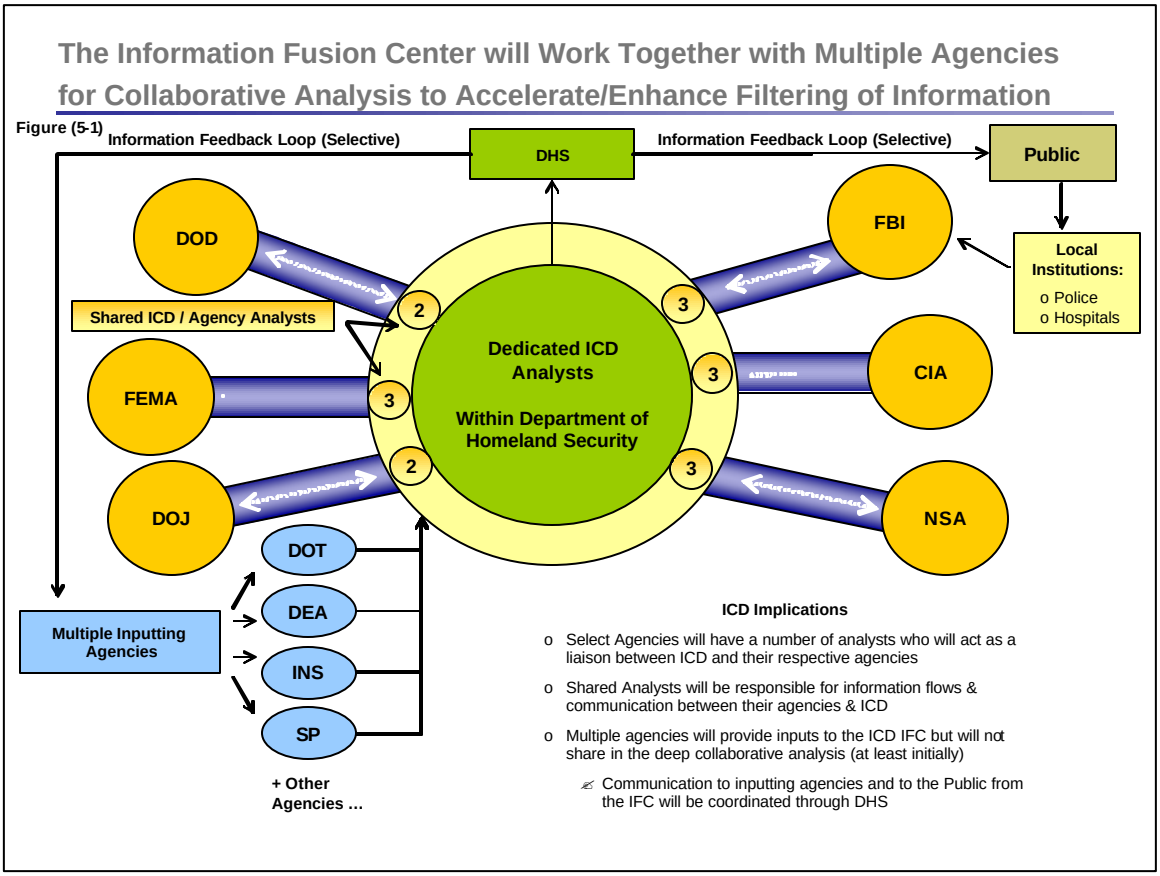
1) LaPorte R.E., Ronan A., Sauer F.W., Saad R., Shubnikov E., "Bioterrorism and the Epidemiology of Fear.," Lancet Infect Dis. 2002.2:326

V. Detailed Operations of the Information Fusion Center

Section IV already showed how defined protocols for sharing information into the Information Fusion Center can enable a high-value new vehicle for detecting patterns to pinpoint potential problems.

Achieving Collaborative Information Sharing & Analysis

Figure 5-1 shows potential organization of IFC. A variety of dedicated analysts with appropriate security clearance will scan across the IFC database to filter information, map symptoms, and help channel investigation via "integrated information." IFC will also share analysts with a variety of agencies that will be involved deeply in information fusion activities across government agencies. These shared analysts will tap their own organizations and internal agency databases to stay abreast of key developments and assure sharing of relevant information on an ongoing basis. At least initially, the "core group" of deeply-involved agencies active in filtering information may be relatively small, focused on the highest-level investigative and analysis agencies, for example: FBI, CIA, DOJ, NSA, DHS/FEMA, and DOD. A larger group of agencies will actively input information to IFC, and will receive back selective "cuts" of data plus reports and alerts from IFC. This larger, 2nd circle of inputting agencies, could include, among others: Department of Transportation, Immigration & Naturalization Service, HHS, DEA, Customs, CDC, and FAA. All communications from IFC to the public and to the inputting agencies would be channeled through DHS to ensure security, message content and consistency.

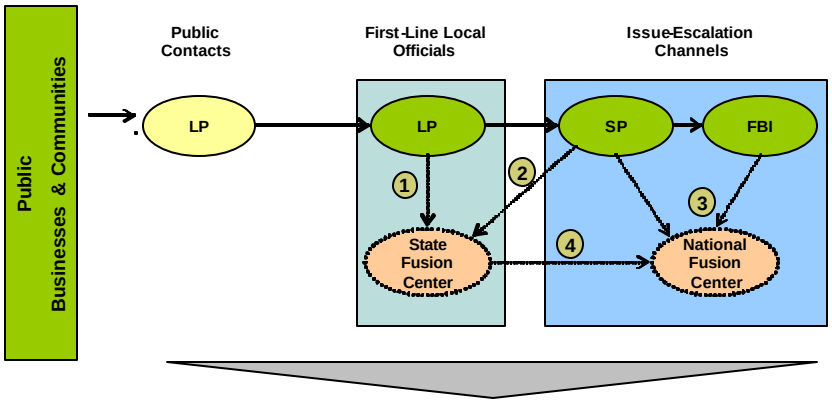


Up to this point, we have referred to a single IFC. In fact, it makes sense to start with a relatively centralized information fusion function, both for simplicity and to contain start-up costs. But over time, greater coverage and effectiveness could be achieved with a combined centralized/de-centralized approach. Figure 5-2 shows an example of coordination across Local and National IFCs (which could also be generalized to Regional IFC). In the figure, Local FC could be efficiently tied in to State or Regional EOC to leverage common infrastructure. Local authorities, such as Local Police would input data to the Local FC. In this way, for example, multiple municipalities could check for overlapping problems in local water supplies rapidly, and even before data is escalated up to National IFC. Investigative escalation from Local Police to State Police or to FBI would trigger automatic release of that information to National IFC (Flows numbered 2 and 3 in the figure). In addition, the Local IFC would have discretion in passing information up to National IFC even before investigation has been formally escalated, if Local IFC believes there is good reason to elevate the information (Flow numbered 4). Figure 5-3 outlines some considerations in implementing any structure of Local, Regional, and National IFC.

Coordination of Investigation with State and National Fusion Centers

Figure (5-2)

Illustrative



Issue Escalation Flows:

1. LP seeks out broader State-level information on local investigative issues, even before escalation to SP
2. Information escalated from the LP to the SP is automatically transmitted both to the State Fusion Center and to the National Fusion Center 3
3. Information escalated from the SP to the FBI is automatically transmitted to the National Fusion Center
4. Represents: **a)** mandatory transmission of information that was escalated from the LP to the SP and/or FBI; and **b)** Discretionary release of regional information from the State FC to the National Fusion Center for issues that could merit broader national level investigation (but have not yet been formally escalated)

Key: LP (Local Police), SP (State Police), FBI (Federal Bureau of Investigation)

Structure for State-level Fusion Centers should be tailored to actual needs

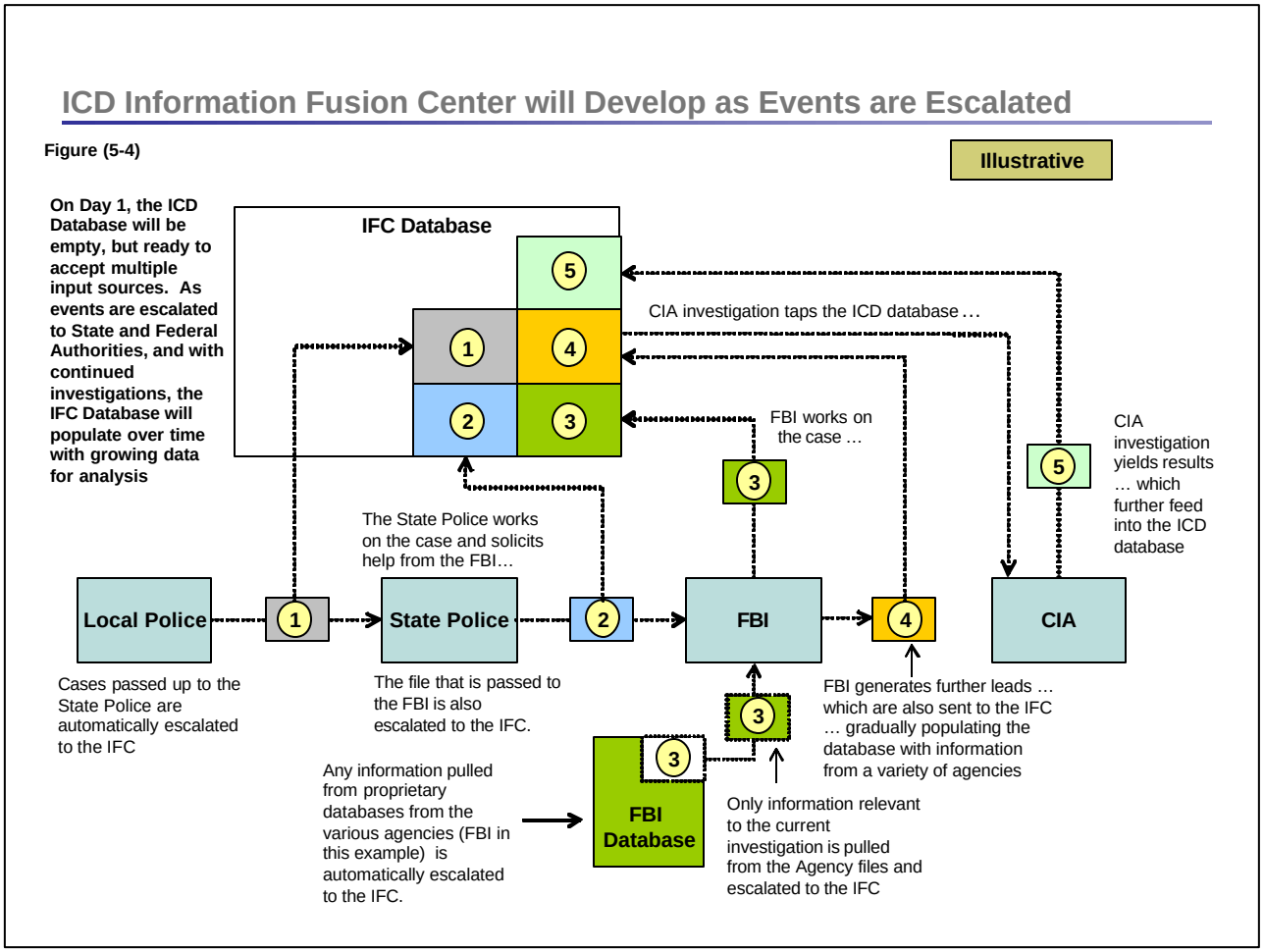
Figure (5-3)

Examples of issues to define further:

- State-level Fusion Centers could be integrated into State EOC (Emergency Operations Centers) to reduce cost of implementation and raise efficiency of integration
- However, not all States will need their own FC -- for example, Montana and other Western states could share a larger Regional FC
- On the other side, some locales may need a FC below the State level -- New York City could be an example
- All State FC could use DHS as a data transmission hub, using new VPN being created
- In general, want to tailor FC structure below National Level to balance: (a) greater coverage to maximize local investigative effectiveness; (b) ensure least number of "hand-offs" across multiple FC; (c) keep down total costs

Building on the above discussion, Figure 5-4 shows how the IFC database would be populated over time. This is a "pragmatic" approach that recognizes that it would be extremely costly and time-consuming to insist on integrating all government databases comprehensively before IFC can launch. Indeed, we believe it is not necessary to wait for

that full integration; that a pragmatic approach can create substantial value in the near term to help the nation share and integrate multiple information sources; and that emergence of better integration capability would enhance even further the scheme outlined in the figure.

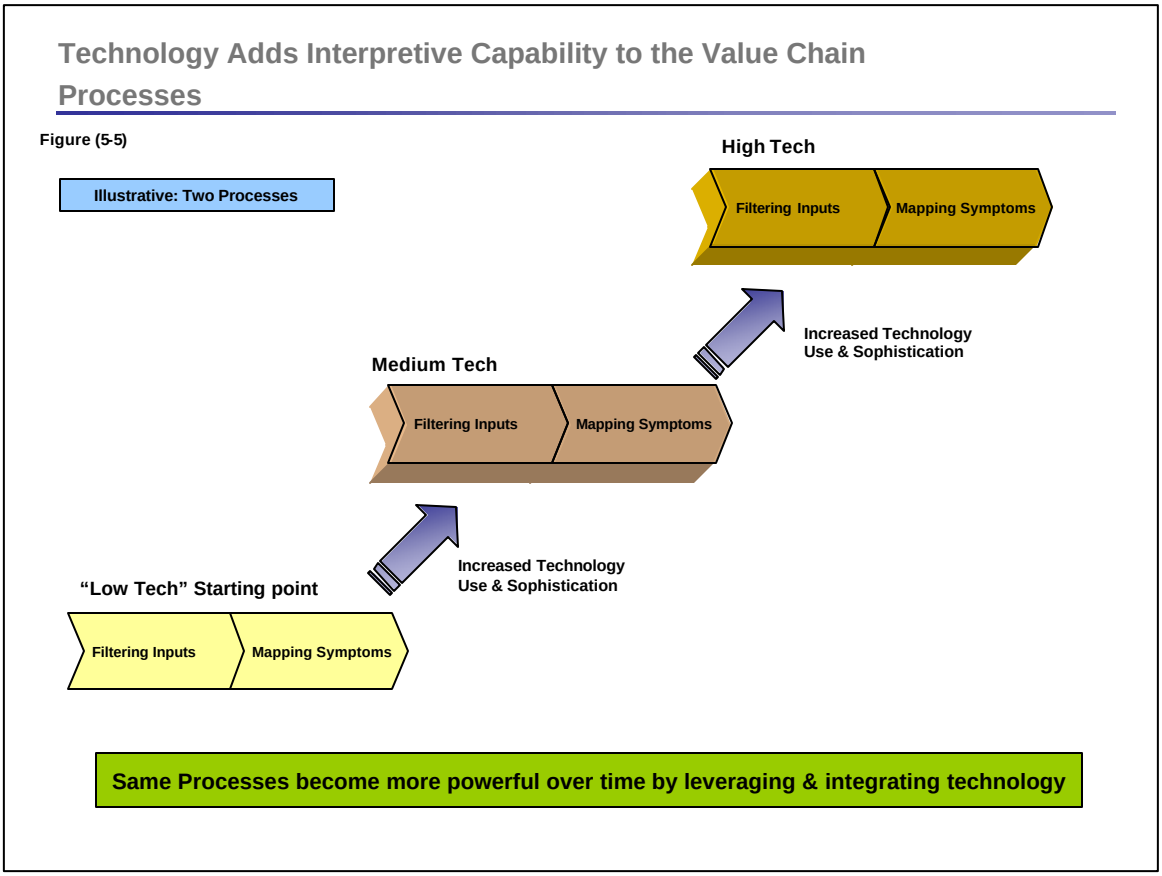


In Figure 5-4, the IFC database starts empty, but is built up actively over time. If, say, Local Police investigation escalates to State Police (SP), the associated information would be directed to IFC (Data Block #1). If SP further escalates investigation to the FBI, Data Block #2 would be added to the IFC database. In this example, the FBI continues to generate new leads, contributing Data Block #3 to IFC, which includes information from the FBI database that is pertinent to the case. Note at this point, IFC would contain only a small part of the total FBI database. However, over time and with continued investigations, IFC would continue to garner the relevant segments from this and other agency databases. To complete this example, further FBI work could add Data Block #4. The CIA would have access to the full IFC database; and uses that information to produce valuable new leads, which results in Data Block #5; and so on.

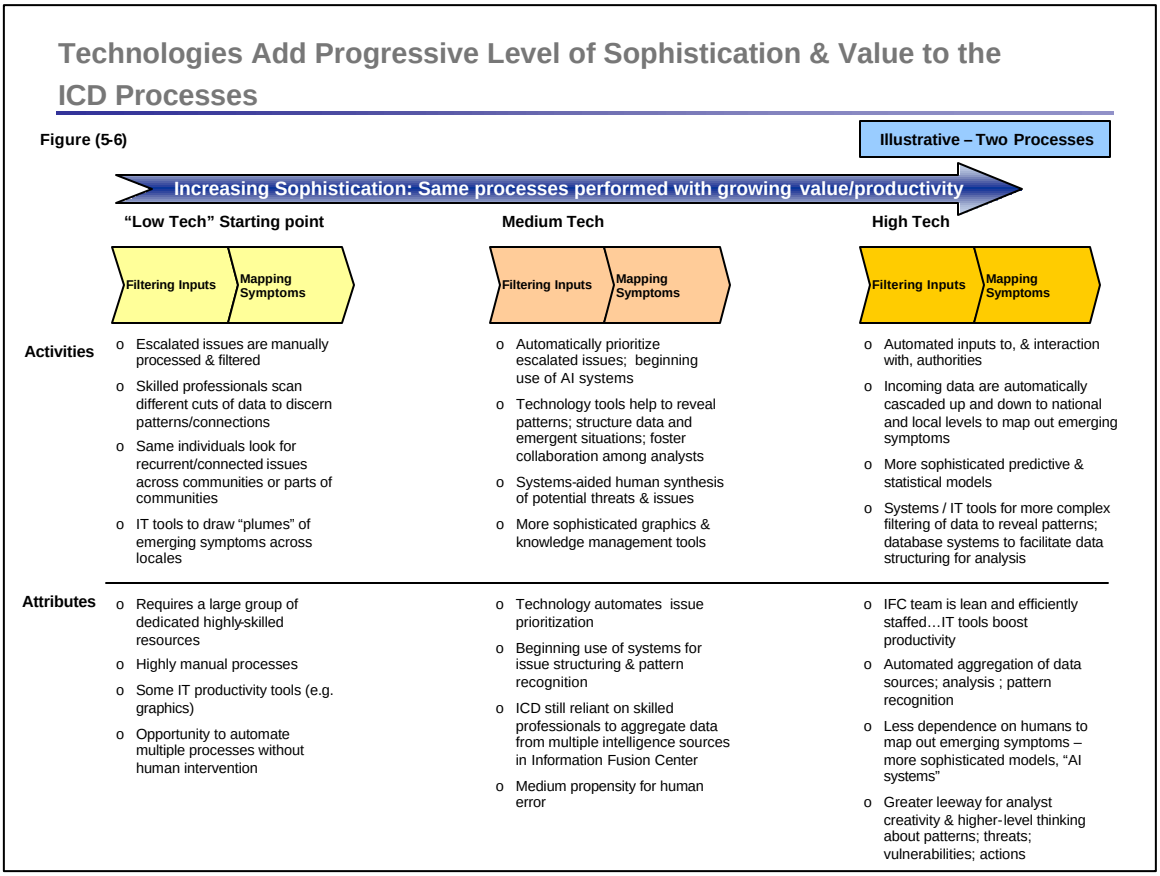
This kind of "build up" of the IFC database from multiple inputting and partner agencies can be accomplished today through application of existing technology. For example, the best approach could be integration software and adapters that enable different computers and programming languages to "talk to each other" (offered by a variety of companies, including Mercator Software and webMethods). Such products are already used widely to process financial transactions (via systems such as SWIFT and GSTPA) and Health Care transactions (including ensuring HIPAA portability requirements across providers); and to connect legacy systems to e-business portals and to applications (such as the FedEx package tracking programs). Web Services offer another, complementary integration vehicle, by directing information flows through web-routed adapters and communication protocols (see Section IX for further discussion).

Leveraging Technology

Figure 5-5 highlights the objective of utilizing more sophisticated technology over time to support Filtering Information and Mapping Symptoms – the core processes that underpin understanding what information is important, then effectively integrating multiple information sources. IFC is being designed with another "pragmatic" perspective: that it can be launched with existing analysis tools and skilled professionals to yield good quality analysis that can be made more sophisticated and more powerful over time by continually overlaying new technologies. In general, the ICD Value Chain has been designed to launch a set of end-to-end processes that can be started today, with existing technology. As new technology becomes available, the overall ICD processes remain identical in kind – for example, IFC Analysts will still be doing Filtering of Information and Mapping Symptoms, among other activities. However, they will deploy the new technology to boost productivity, speed, reach, and interpretive power.



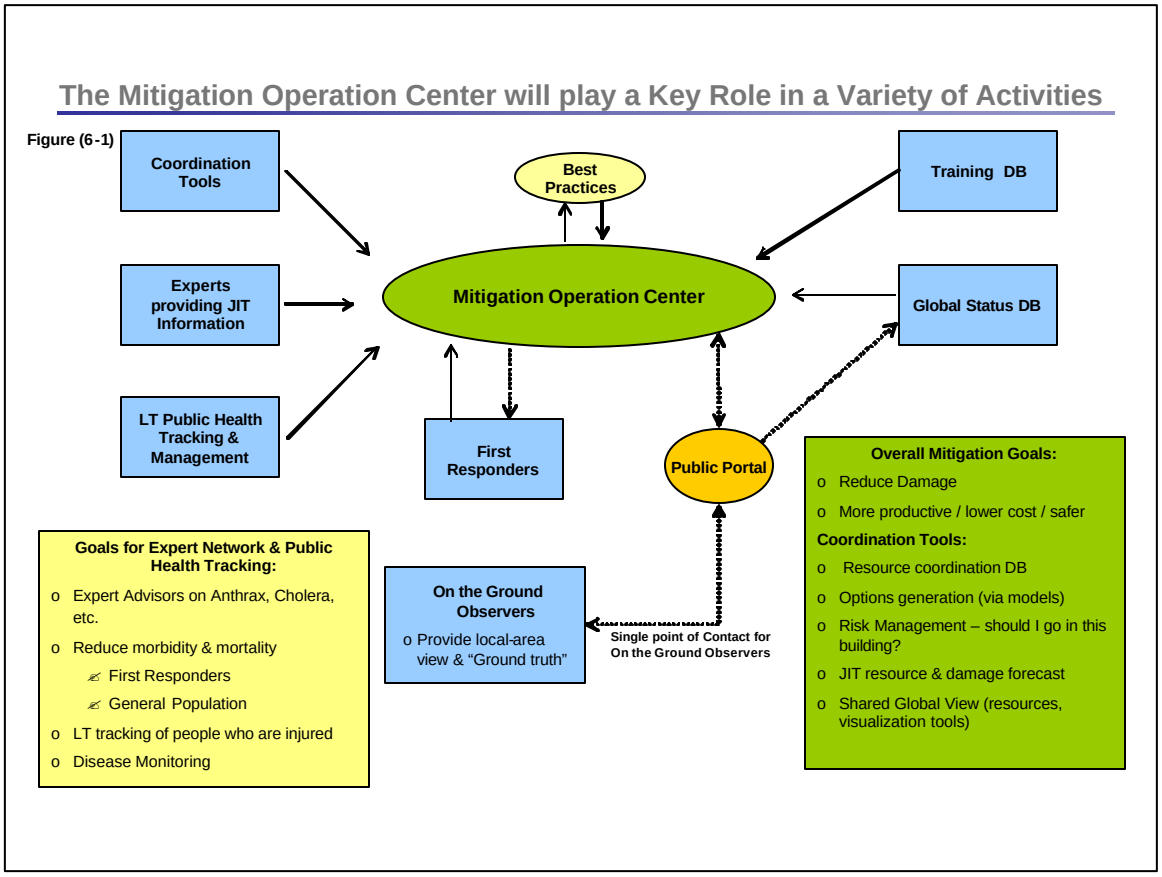
What are the relevant technologies that can and should be developed and deployed? Figure 5-6 gives some examples pertinent to the processes of Filtering Information and Mapping Symptoms. For example, in the middle column, Artificial Intelligence (AI) systems can help to prioritize escalated issues. Other technologies can help to structure data, recognize patterns, and foster collaboration among dispersed analysts (including P2P software tools such as Groove, and structured argumentation tools). Graphics tools help show emerging problems along multiple dimensions: by geography, symptom, etc. Knowledge Management (KM) tools (currently commercial from companies like ClearForest, as well as the MITRE GeoNode system mentioned earlier) can scan vast amounts of text; extract relevant information specific to users' requirements; and provide summaries along multiple axes, using different communication modes (graphic, text, multimedia, etc.).



Over time, at the right column of Figure 5-6, even higher-value technology would include: more powerful predictive and statistical models; database systems to leverage relatively un-structured data; and more complex filtering technologies. Section VIII discusses some of the advanced technologies that can be brought to bear to benefit ICD over the next 2-5 years. For example, the DARPA-funded Genoa II program will provide a succession of tools for collaboration, scenario development, and options generation/evaluation. As a complement, the Communicator program (already commercial in the United Airlines Lost Luggage application) will enable language-driven interaction between humans and computers, including alarm-driven messages for analysts and in-the-field guidance for First Responders.

VI. Detailed Operations of the Mitigation Operations Center

Figure 6-1 overviews the main functions of the Mitigation Operations Center (MOC). MOC's fundamental mission is to help achieve earlier, safer, more productive and thereby less costly mitigation.



MOC will fulfill this overall mission through hybrid "tactical" and "strategic" roles, both in support of improved mitigation operations.

At a tactical level, toward the bottom center of Figure 6-1, MOC will be the contact point with the On-the-Ground Volunteers Network organized through the Public Portal, to help deliver JIT status information to guide efforts of the First Responders. These volunteer observers will provide key "Ground Truth" to convey vital damage and status information to the First Responders. MOC will also provide JIT information from the Global Experts Network, and will provide overall coordination tools that help the First Responders act more effectively in concert. High-value tools could include: (1) Resource Coordination database to input all available and required resources; (2) Risk Management tools – to advise, for example, on whether or not to enter a given building; (3) Tools to create a "Shared Global View" of a complex mitigation operation – including

visualization tools and resource maps; (4) Options generation tools; and (5) Expert Advisory tools.

At a more strategic level, MOC will also support operations by: Serving as a Center of Excellence to collect and disseminate Best Practices from around the U.S. (and eventually, around the globe); Developing innovative training mechanisms for First Responders – including simulators to enhance crisis-readiness; and Long-term Public Health Tracking and Disease monitoring (in concert with Public Health officials). Because MOC will have direct contact with the First Responders and volunteers, MOC provides a natural "collecting point," via the Internet, of health tracking information over time – data which, today, are notoriously hard to collect in a systematic way.

Figure 6-2 shows how MOC would interact with the On-the-Ground volunteer network. MOC could employ a clickable map that summarizes all available volunteers by geography and by specific community, to enable rapid access to contact information. The volunteers would provide valuable information to efficiently direct emergency response agencies —such as location of elderly or disabled; building floor plans; neighborhood maps and access points; and on-the-ground situation information. Such local, real-time knowledge – what Emergency Responders call "Ground Truth" -- will help speed response and make it more targeted and safer. The MOC will also receive critical status information from National or Local IFC.

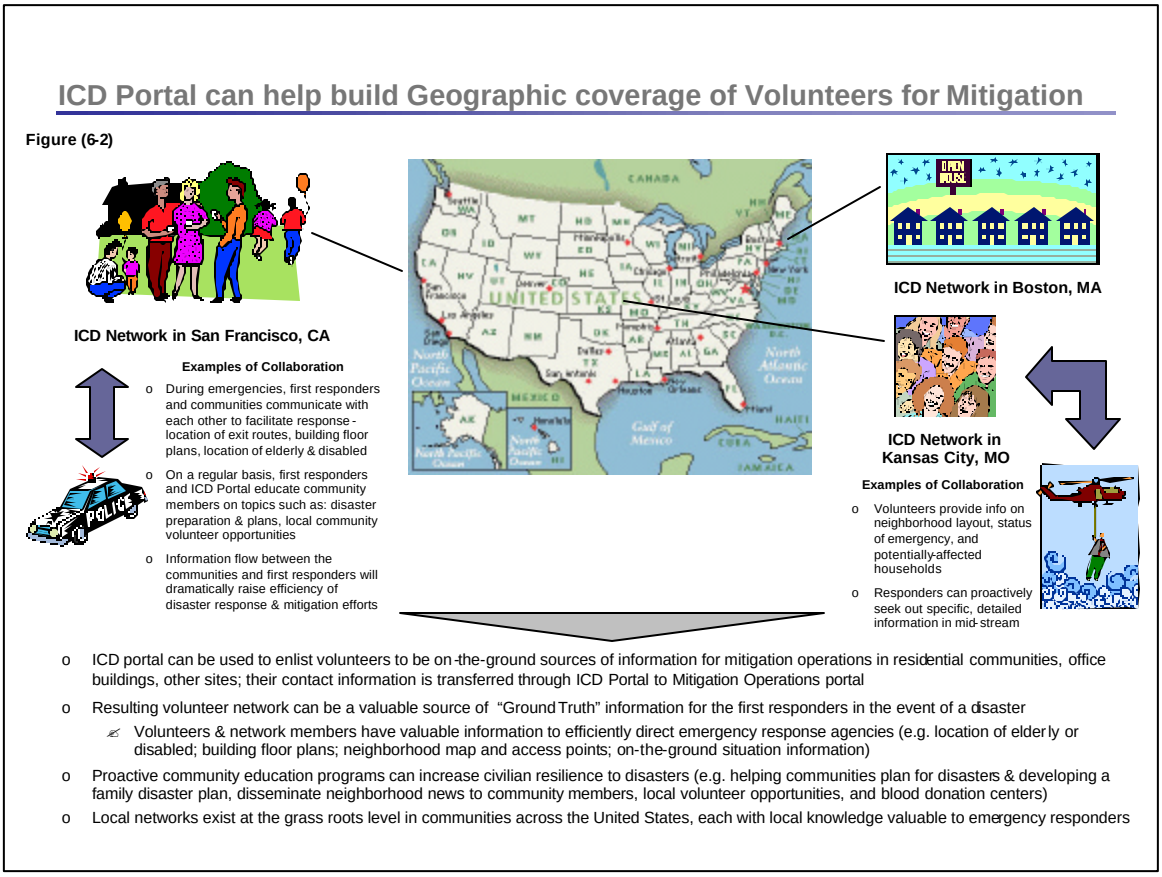
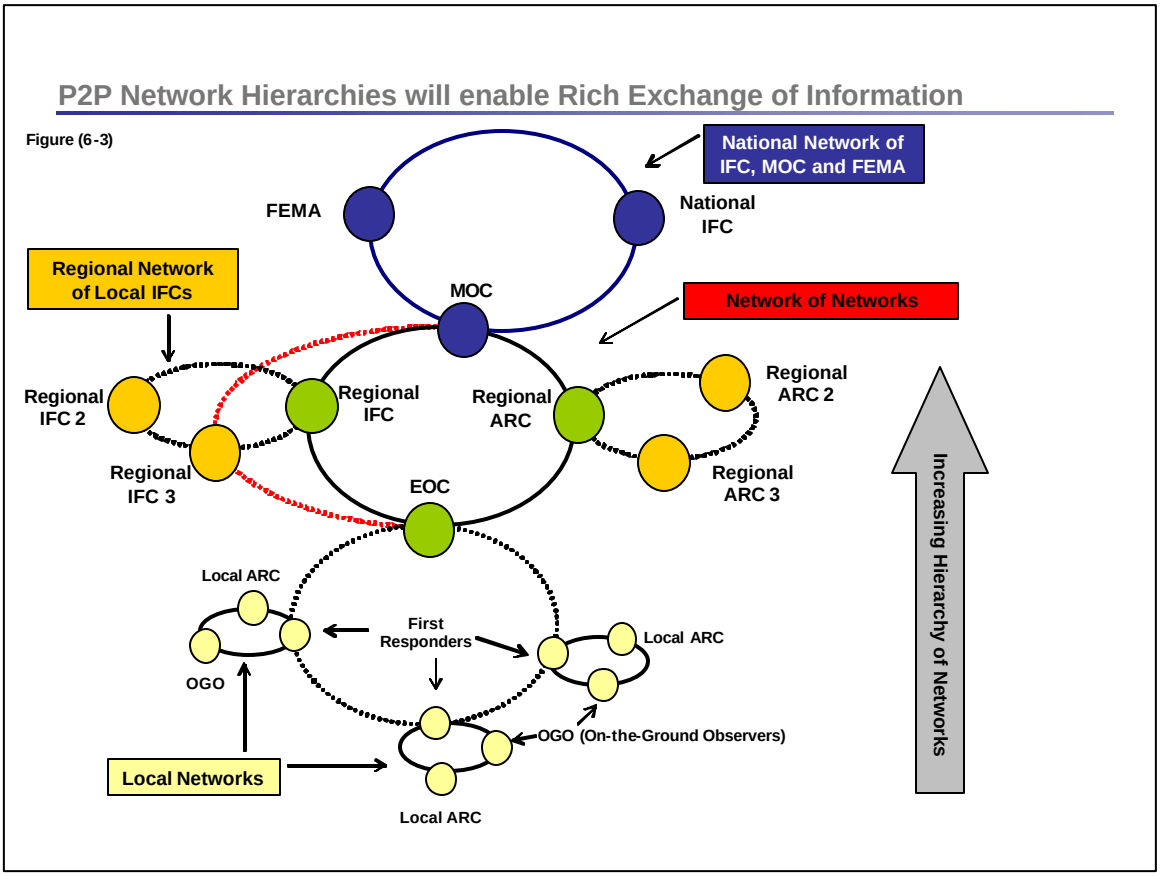


Figure 6-3 summarizes how the resulting interaction across the MOC, First Responders, and Fusion Centers will create valuable Peer-to-Peer (P2P) networks that cascade upward to carry information from the local to state, then on to regional and national levels. For example, local P2P networks will connect First Responders, Regional ARC, and On-the Ground Observers (OGO). These networks will communicate in real time with higher-up networks coordinated by Regional EOC and potentially involving information collection & channeling via State/Regional IFC. At the highest level, the MOC and National IFC and FEMA/DHS will "see" status information coming out of multiple community networks – and will therefore be better equipped to provide guidance and direction.



Moving toward Neighbor-to-Neighbor (N2N) Networks

Over time, ICD can provide a vehicle to leverage the Internet to create rich communications at a neighborhood level, in a way that helps make those neighborhoods safer. N2N transfer (neighbor to neighbor) is ultimately critical for fear reduction, mitigation, and risk reduction for first responders.

Figure 6-4 shows three alternatives to create N2N networks, with growing benefits in each case. In each level, an accredited member of the On-the-Ground Volunteer Network takes responsibility as Coordinator to act as the equivalent of a Neighborhood Watch "Block Captain," to help organize neighborhood e-mail lists and mobilize other neighborhood preparedness activities. (That individual may ideally be an actual NW Block Captain, or not). In the simplest Level 1, the Coordinator helps organize neighborhood e-mail lists, to help the neighbors stay in touch. In Level 2, simple automated "ICD Neighborhood Groups" enable e-mail communications to the overall group just by typing in the group name. For example, community newsletters could be circulated in this way, or the Coordinator could distribute particular ICD materials of general interest. Either the Coordinator or individual neighbors could also contact the MOC to provide valuable input for mitigation operations. Reciprocally, the MOC could send targeted local communications or alerts to specific ICD Groups. Level 3 would actually get the neighbors on to more sophisticated and secure P2P tools such as Groove.

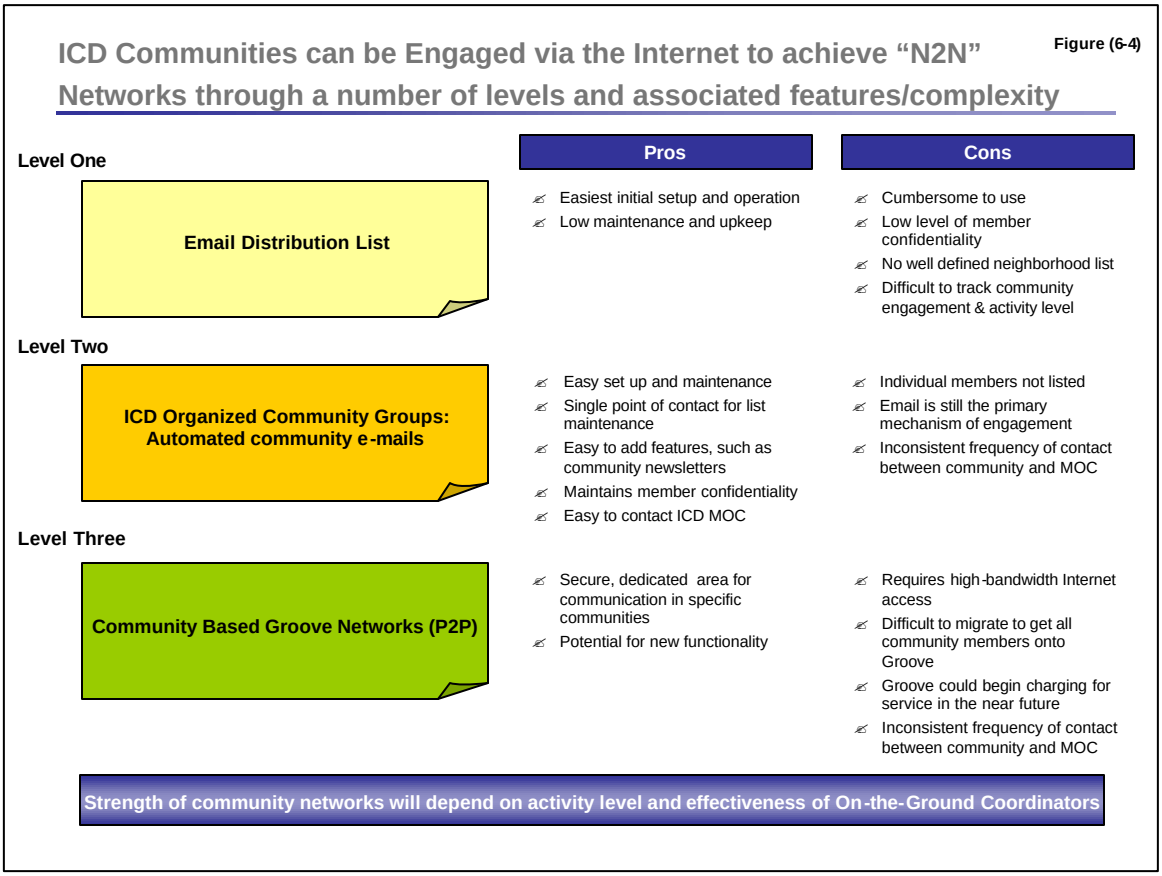


Figure 6-5 summarizes the merits of the three levels. Moving from Level 1 to Level 2 is quick and involves low effort/complexity; but brings significant value via ease of use, to help neighbors communicate at all points in time, but especially during crisis (including back and forth with the MOC). Moving to Level 3 P2P tools brings both greater capability and complexity. The attractiveness of that further step probably lies in the future with easier-to-use tools with community-oriented features (such as simplified local network configuration and graphical publishing tools built in).

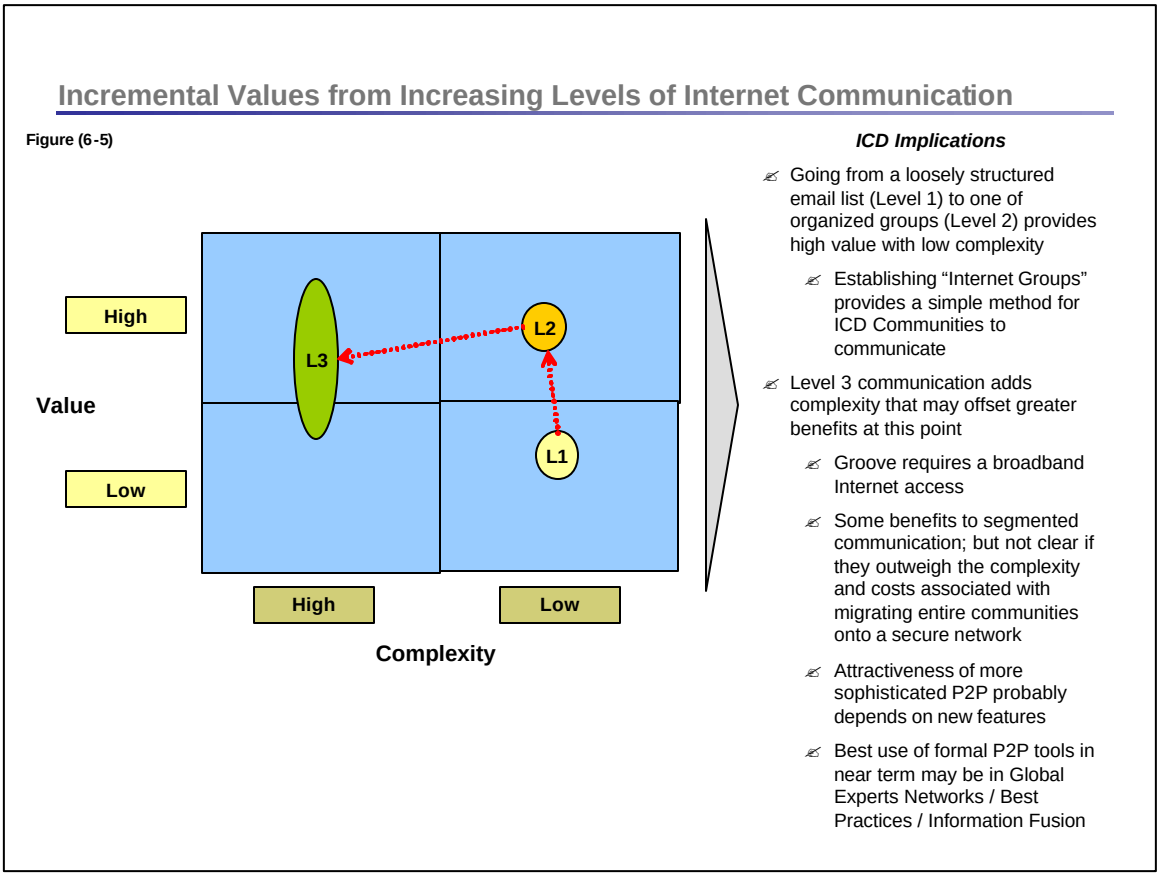


Figure 6-6 shows how ICD Groups would work, by typing in a simple e-mail address that reaches the entire neighborhood group. The Neighborhood Coordinators could use the ICD Group to circulate preparedness materials for neighborhood discussion; to help quell rumors during a crisis; and most important, to communicate with the ICD MOC and thereby to the First Responders, about crisis conditions.

Another valuable application of ICD Groups can be to create a "People Locator Service." ICD users could readily create designated groups of neighborhood friends or "friends and family" that they would want to reach in the midst of crisis. When on 9/11, the first jet liner crashed into the World Trade Center, news reports wailed across the televisions and radios of the world. If you had a child in New York, or a friend or relative, what was your first thought? During the time of a disaster, the first thing we want to know if our family and friends are safe. There is a desperate fear of the unknown status of our loved ones. We need to find out if our father, sister, or college roommate is "okay".

But at the very time that the need for communications rises, the communications links tend to be overloaded due to damage to wires and transmission centers; or just the gridlock caused by increased calling around for information. ICD Groups can help to automate contacts with neighbors and family members to help locate them, or to give assurances that we are safe. An extension of this concept could accelerate notification of loved ones about injuries or the deceased; thereby strengthening social networks.

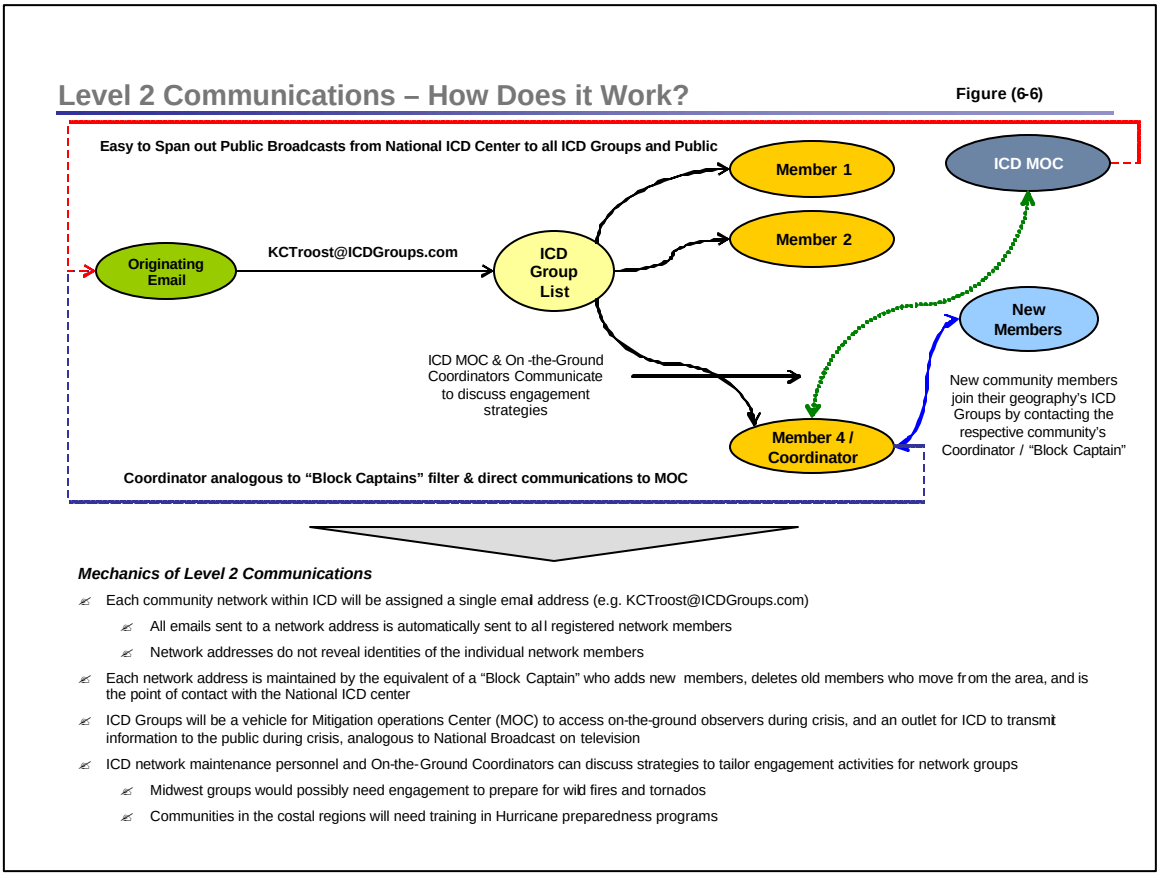
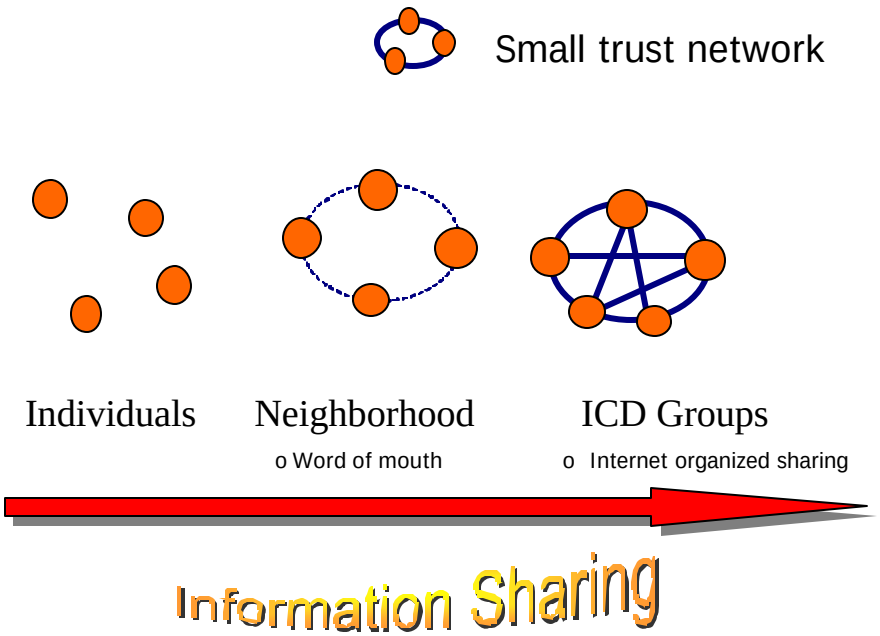
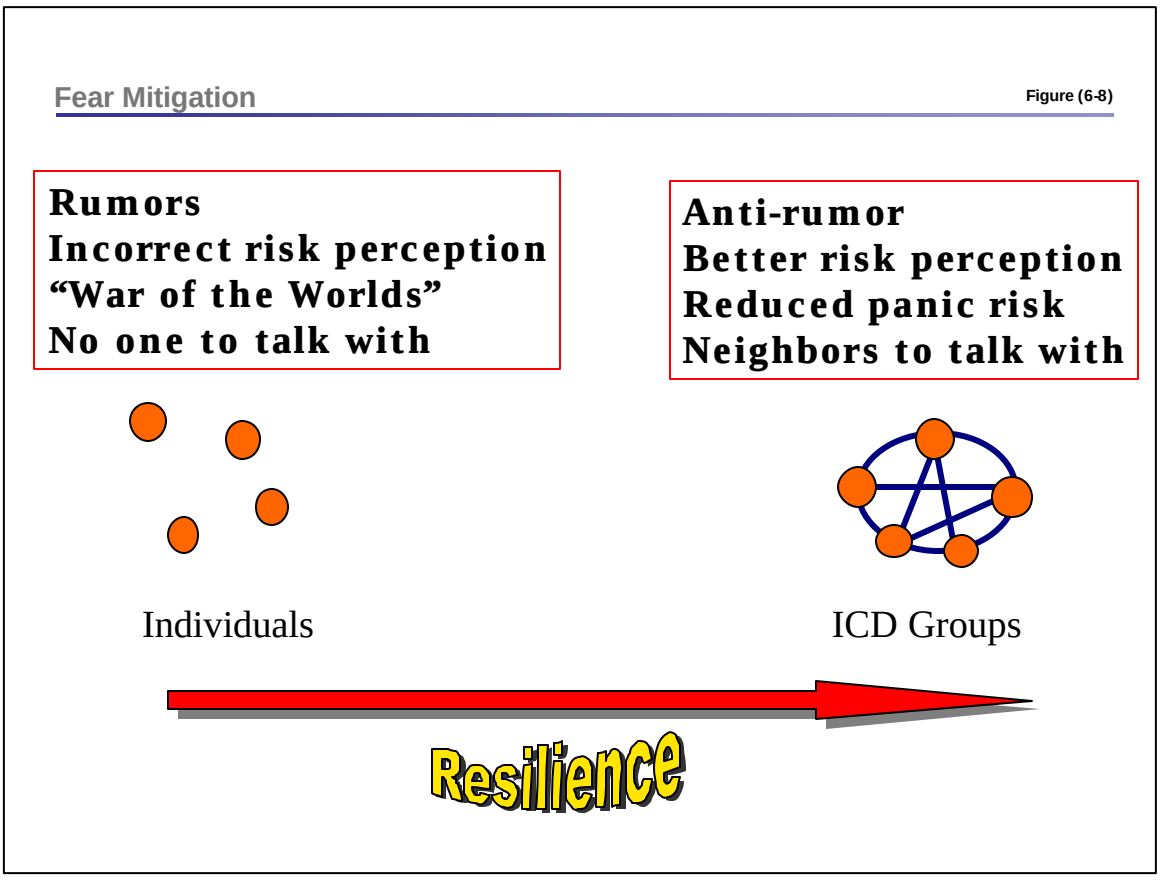


Figure 6-7 and 6-8 show how N2N networks would help foster Neighborhood Safety, Resilience, and Fear Management. The core concept is that inter-connected neighbors have both better access to information, and stronger sense of community.

Building N2N Networks for Neighborhood Safety

Figure (6-7)





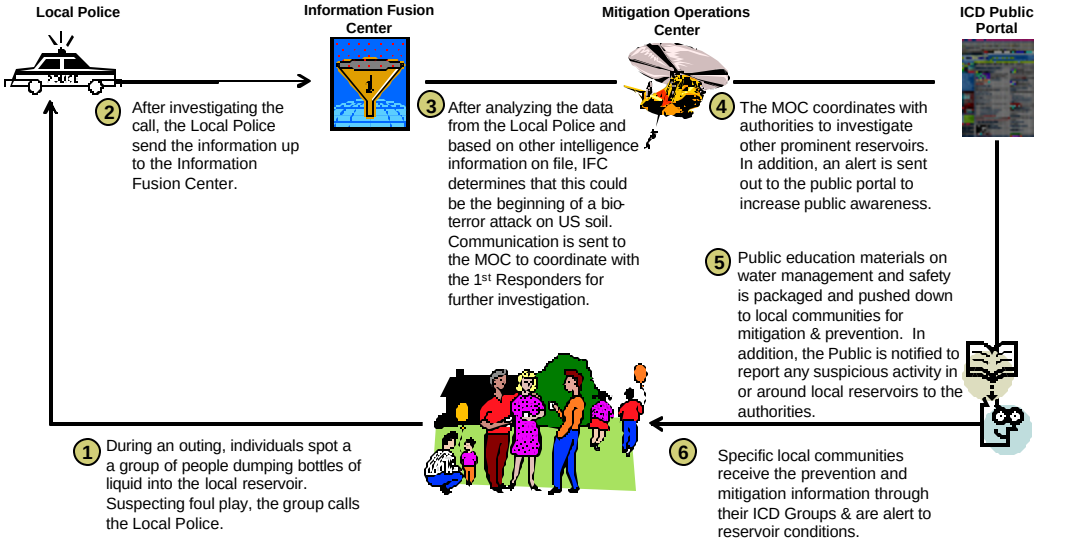
Enabling Highly-targeted Mitigation Operations & Alerts

Building on the above discussion, Figure 6-9 shows how ICD N2N networks can amplify the effectiveness of mitigation operations and alert systems, by making them much more focused and community-specific. The example in the figure starts with individuals observing potential contamination in a local water supply or reservoir. That observation eventually gets escalated up into the Information Fusion Center and triggers focused investigation and potential mitigation operations in adjacent communities to detect problems; minimize damage; and help the public become informed and prepared.

The MOC and the Public Portal can activate Neighborhood-level Communication & Involvement at the onset of a Public Threat

Figure (6-9)

Illustrative



Apparently small events at the local level can reveal broader threats…the MOC and the Public Portal will be the focal point of communication with the First Responders and the Public

However, consider the same "feedback loop" operating with a different entry point: In particular, consider the recent sniper investigations in the Washington DC, Maryland and Virginia areas. With an ICD system, community-specific alerts could be issued to ICD Groups in those neighborhoods, via push-down e-mails, to activate and energize public involvement. The ICD Public Portal could simultaneously be used for broader communications and alerts. In this way, ICD could expand the effective vehicles through which targeted alerts can reach the broad public, and thereby foster faster, more proactive response. In this example, ICD doesn't replace any existing communication systems – it helps expand reach and improves timeliness of response. Over time, the ICD system could be supplemented to maintain a list of alerts available at specific local levels – such as cellular alerts and EAS – and thereby become a key coordinating vehicle in community alerts. The vision, and potential, is for ICD could become a "backbone" to coordinate multiple Emergency Management "inputs," meaning information and status sources, and "outputs," including local alerts (see Section VIII on Technology Enablers).

As another application, suppose that a particular neighborhood suffers a spate of household fires. Beyond supporting mitigation operations, the ICD network could be used to send out targeted e-mail educational materials on fire safety to specific adjacent communities, and thereby help foster awareness and preparedness.

Similarly, the outbreak of smallpox in a community could trigger push-down e-mails for vaccination and information alerts.

During an emergency, the ICD Network can expand its reach in a variety of ways: Neighbors can notify other neighbors of events by ICD Group e-mail, or simply by knocking on doors; the On-the-Ground Coordinators can mobilize neighbors, or contact adjacent Coordinators; and the MOC can outreach proactively to specific Coordinators or via targeted community e-mails, to solicit status reports – for example, on hurricane severity, as input to solicit Mutual Aid from a nearby community. In each case, the foundation is local-level, targeted information to inform mitigation operations and accelerate recovery from disasters.

The concepts of "Trust networks" and localized alerts can also help to foster early detection and mitigation of threats from agricultural bio-terrorism (for example, see Henry S. Parker, "Agricultural Bioterrorism: A Federal Strategy to Meet the Threat," National Institute for Strategic Studies, 2002). Agricultural sources are frequently accessible, and therefore vulnerable; and spread of pathogens could be un-detected for long periods of time. A trust network could be created to enable and encourage early, discrete testing in support of mitigation operations, thereby limiting potential damage to agricultural states and to our overall economy and society.

Once in place, an ICD system can support a variety of applications to support more rapid and effective mitigation of diverse threats by leveraging the power of neighborhood networks, information fusion, and localized alerts.

VII. Recruiting and Network Building

Figure 7-1 summarizes ICD's objectives for recruiting and network building. Basically, ICD will partner with multiple community-based organizations to collectively build up a network of 5M+ "eyes, ears and brains" at a national level, with significant coverage in vulnerable areas. In partnership, ICD will work to become a "trusted" brand for timely, insightful, and actionable information and guidance. Network coverage of 1-2% of the national population – and thus, approaching 5% of families -- would start to yield critical mass, with the potential to grow further from there.

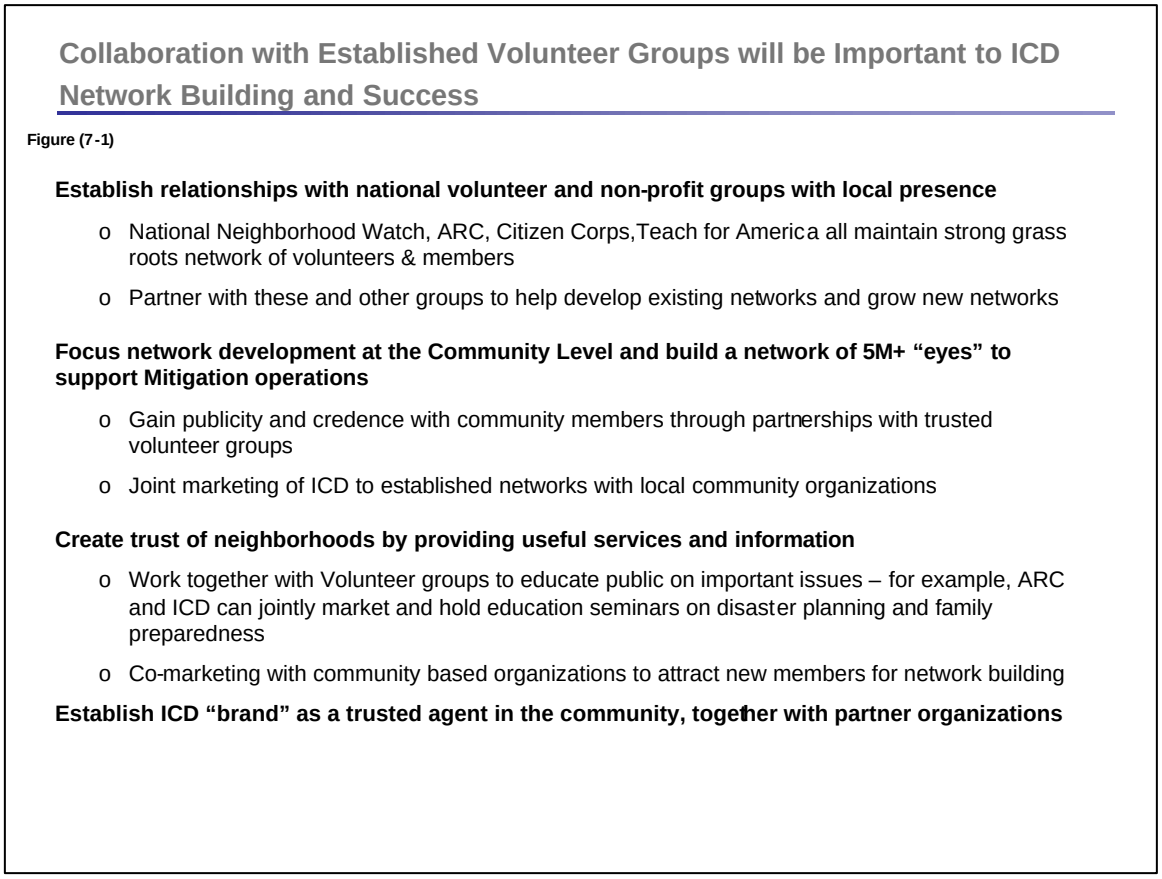
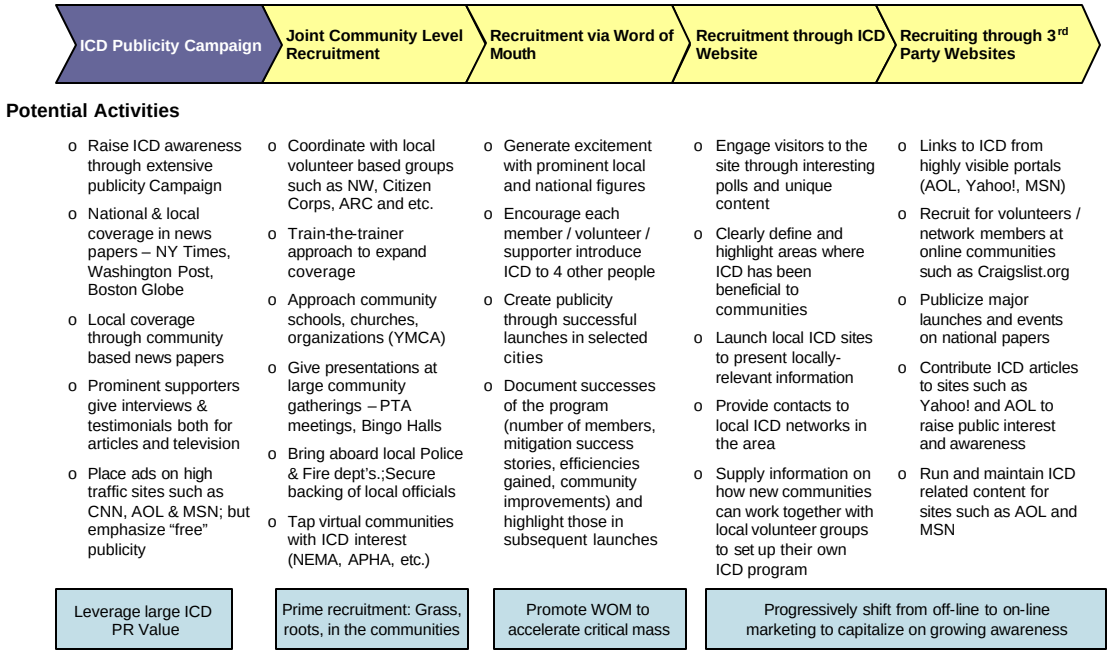


Figure 7-2 overviews the ICD recruiting approach, which is expected to build in stages. At the left side of the figure, early-stage launch activities should capitalize on the ripe publicity value of ICD – prominently publicizing linkages to ARC, FEMA, Citizen Corps, and other partner organizations. While ICD will be equipped with a publicity budget, emphasis should be on maximizing and leveraging "free" publicity, especially on national media.

ICD Recruiting Process will build in progressive stages

Recruiting Process Stages — **Figure (7-2)**



The next stage of recruiting will be the most important "prime" for the ICD network. This phase will involve "off-line" marketing – getting out into multiple communities, along with ICD partner organizations, to create awareness of ICD. Grass roots marketing will likely occupy a major part of ICD's first year of existence. ICD can capitalize on existing networks by reaching them together with partners: for example, tapping only a percentage of the 18-50M people involved in Neighborhood Watch, or the 1M+ national volunteers of ARC, can go far toward reaching ICD's second-year goal of 2M users of the Public Portal with 40,000 On-the-Ground Coordinators to support mitigation operations. These existing volunteer networks are expected to have a high % of active Internet users who would be prone to have interest in ICD content and programs. Instituting a "Train-the-trainer" approach together with ARC and influential local organizations can boost coverage and thereby, accelerate speed and extent of ICD network penetration of the local population. Activating the "People Locator Service" could draw significant numbers of users to ICD – all eager to enroll their personal neighbor and family networks.

ICD can also grow by reaching out to business and to the professional societies that are "natural interest groups" because of common concerns for emergency management, safety, and infrastructure protection. Figure 7-3 presents a starting list of some of the professional groups that ICD should target – both as sources of members and network growth; but also as ongoing, real-time providers of valuable ICD content for the Public

Portal. Business groups should also be strong natural allies of ICD, with common interests in protecting employees and critical facilities, plus overall national security.

Starting List of Professional Organizations that are "Natural Affinity" Groups for ICD

Figure (7-3)

NEMA (National Emergency Management Association)

ISEM (International Society of Emergency Managers)

ASIS (American Society of Industrial Security)

ASSE (American Society of Safety Engineers)

NOAA (National Weather Center)

NFPA (National Fire Protection Association)

APHA (American Public Health Association)

As ICD visibility grows, word of mouth (WOM) will become a more important driver of growth. WOM can be further encouraged by selective publicity that documents successful growth in ICD viewership and participation; and importantly, by maintaining high-quality and "fresh" content. The same content delivery and communication strategies that foster retention of the overall user base and especially the On-the-Ground Observers Network will also foster positive WOM (see Section IV on Neighborhood Network Building).

As more users access the ICD Public Portal, on-line recruiting can begin to take off. ICD should also explore cooperative links with the major portals and ISPs. For example, DHS/FEMA could encourage AOL, MSN, CNN and Yahoo! to provide "buttons" that enable immediate access to the Public Portal, especially in time of emergency.

The remaining pages of this section outline specific ICD strategies to reach target groups for network building: Offices & Commercial buildings; Schools; Suburban neighborhoods; Low-income neighborhoods; and Professional Societies.

Initial Recruitment Targ
who are Key influencer

Key Areas
Communities with Established Neig Watch and other Established Volun Communities
Offices / Commercial Buildings
Schools
Suburban Neighborhoods (No Established NW)
Low Income Neighborhoods (No Established NW)
Professional Societies with Natural

- **Depending on the area, ICD must in**
  - Gaining the support of the existi
  - In communities without establis potential partners include the Ci

The Recruiting Strategy Needs to be Tailored to Each Target Area & Key Individual

Figure (7-5)

Recruiting in Communities with Established Neighborhood Watch & Other Volunteer Programs

- Approach established Volunteer Groups and enlist partnership
  - Having the support of an established network increases chances of ICD success; high percentage of members likely to be already on the Internet
  - Present clear ICD value proposition and how it increases leverage / effectiveness of existing volunteer network
  - Position ICD as the "community's program," bestowing a sense of ownership
- Branch out from volunteer groups to other local organizations: Local Fire & Police Departments, Churches, Schools and etc.
  - Jointly market and develop established networks recruit other local organizations, adjacent communities and new users to build a network of 5M+ "eyes"
- Establish specific goals that addresses the needs of the community
  - A goal for one group could be to have the monthly community newsletter all moved online to a web site or have it distributed via email to all the households to increase communication
  - Goals can be diverse, but focused on community safety and cohesion: Have community volunteers come together to renovate the neighborhood playground
- Provide incentives and continually engage the community so the network will grow
  - Give national recognition to fastest growing communities or communities reaching critical mass membership
  - Highlight successful partnerships between ICD and local volunteer groups and share best practices
  - Locally, give awards to most active ICD network users and volunteer groups
- Multiple "front line" organizations also have day-to-day presence in communities, and can provide volunteers for mitigation support
  - Examples include: Nurses and Hospital workers; UPS/Fed Ex employees; Postal workers; Newspaper delivery

Enlist Strong Approval & Support for ICD in Local Communities from the established volunteer groups

The Recruiting Strategy
Key Individual

Strong partnership with A

- ARC Volunteer base repre generally, in the communit
  - Tapping ARC volunteers to ARC mission
  - ARC volunteers are a logi
- ARC involvement in ICD i ARC image through broad
- ARC know-how in training
  - Joint development of on-l
- ARC expertise in disaster
  - Common branding of sele
    - ICD and ARC can joi
    - Joint on and off-line equity of ICD

The Recruiting Strategy Needs to be Tailored to Each Target Area & Key Individual

Figure (7-7)

Recruiting in Office Building & Commercial Neighborhoods

- Generate support from key influencers – CEOs, Administrative Officers and etc.
  - Present diverse problems faced in 9/11 and how ICD could help in the event of another disaster
  - For multi-office buildings, gain support from the largest / most prominent firms in each office complex
- Approach existing Fire Wardens and seek best methods for capturing mitigation "eyes" in offices
  - Fire Wardens generally have the communication & evacuation strategies for emergencies
  - Fire Wardens can be the focal point of contact and potential "Block Captain" for businesses / floors
- Branch out from one prominent corporation to another, to lay foundation for the network
  - Establish a sense of belonging and create desire for other firms / floors to join
- Grow ICD over time into content and services that could be useful to businesses
  - Create value-added information & services that businesses will pay for
  - Example: International travel and health issues; online utilization rates of ICD communities
- Continually engage and keep contact with the members of the network
  - ICD's weekly email newsletter to member can be a source of local happenings
  - ICD can be a source of potential both long and short-term volunteer opportunities
  - Weekly news updates about what is happening in ICD networks around the neighborhood

Gain Support from Officers from Large Corporations to Gain Entry into Commercial Neighborhoods

The Recruiting Strategy Needs to be Tailored to Each Target Area & Key Individual

Figure (7-8)

Recruiting in Schools

- Generate support from key influencers – Local School Boards, Key Decision Makers, Principals & Teachers
  - Show significant opportunity and benefits of partnering with ICD and building local networks
  - Highlight communication problems faced by NY area schools during 9/11 and how ICD fosters family preparedness, including family communication plan during disasters
- Emphasize the power of a network of schools within neighborhoods can help existing problems
  - Schools in similar communities encounter common types of problems – gang fighting, drugs, suspicious individuals – from the same groups; ICD could alleviate these problems with a networked school system where one school notifies the other schools in the area of any potential problems
- Tap into local PTA and gain support of the parents and teachers
  - Joint off-line marketing with school officials during PTA meetings and other parent – teaching gatherings
  - Create visibility and encourage students and families to get involved in preparedness planning
- Continually engage and keep contact with the schools in the network
  - ICD could eventually have a portal devoted just for schools
  - Develop school curriculum together with ARC, following successful model of ARC "Masters of Disaster"
  - A successful school district can be showcased at the national level as a potential model for others to follow
  - Recognize that long-term success will spring from sustained educational effort, starting in the school systems

Gain Support from Officers from the Local Board Members, Principals and Key Decision Makers to Penetrate the US School System

Target Area &

Figure (7-9)

nd other community based

halls, and etc. and begin garnering

CD and how potential partnerships

tworks and partnerships

amage

e improved – ICD providing
center, ICD members coming

ommunity cohesion and

work will grow

ith X amount of people

Departments … Coupled with
dents

The Recruiting Strategy
Key Individual

Recruiting in Low Income N

- Generate support of the local
  - Seek out and gain support of
    - Local YMCAs, soup kitc
    - Volunteer groups such a
      in low income neighborh
  - Generally local police departm
    - Help facilitate communic
- Create public good will and ga
  - Donate ICD Kiosks to organiz
  - Gain support and establish pa
- ICD provides valuable service
  - ICD provide information and
  - Relief agencies and potential
    and/or resources
  - Reduce vulnerability to disast
- Continually engage the comm
  - ICD networks can be utilized
  - Communities can organize th
    problem

Focus on successfu

The Recruiting Strategy Needs to be Tailored to Each Target Area & Key Individual

Figure (7-11)

Recruiting Virtual Communities / Professional Societies

- Highlight ICD value add for each relevant professional community & potential for partnerships
  - Position ICD as a service / offering that allows each Professional Community to better serve its organization and meet its goals
    - ICD can help provide the infrastructure where key knowledge within the Professional Network is catalogued and archived; network knowledge is put to use; expanded knowledge is generated through filed use/applications
    - Certain virtual communities can benefit for select access to established P2P network of experts
  - Expand visibility and distribution for partner organization content and events (e.g. local chapter meetings)
- Request and offer to present at organizational & member meetings
  - Professional Organizations can potentially provide volunteers, expertise and inputs that will better ICD and its services
  - ICD can help each organization develop current network and expand membership levels
- Refer local area residents and professionals to different Professional Organizations via links on ICD website
- Obtain list of prominent and active professional organizations within each ICD city / community
  - "Natural interest groups" for ICD span safety, public health, industrial security, and emergency management

Focus on relevant professional organizations that can leverage ICD network and provide inputs, expertise and volunteers to carry out ICD mission

Word of Mouth can be a Powerful form of Recruitment

Figure (7-12)

Attributes of Word of Mouth	ICD Implications
o It is the most credible & honest form of advertisement & publicity ✍ Community members will respect personal experiences of other neighbors over any other spokesman o It has an immense ability to get people to act ✍ In business, people tend to make purchases on the advice of trusted peers – decisions to join the ICD network will be no different o It reaches more people faster – and at lowest cost -- than any other form of direct advertising as it breaks through the clutter of everything ✍ "Even those deaf to the bragging cries of the market place will listen to a friend" ✍ Now with increasing use of email, the power and speed of word of mouth is staggering o Negative experiences will do more harm than benefits from positive experiences ✍ Individuals feel strongly about bad experiences; will be more likely to tell people about them than people with positive experiences	o Strive to achieve positive results and benefits for every community, network, and user o Assume that there is no room for error – especially in the initial launch phases ✍ According to studies, a dissatisfied customer will tell approximately 11 people whereas a satisfied customer will tell about 3 ✍ Good experiences are expected but soon forgotten while bad experiences are frustrating and persist o Promote benefits that ICD is providing to the community (e.g. with ARC, NW) ✍ Continually publish updates and progress reports for each community / network ✍ Conduct surveys and polls of members on how networks established by ICD have helped the community and how services can be improved o Provide testimonials on user experiences & successful partnerships (e.g. with ARC, NW) o Incentivize members to bring in friends and family into the network ✍ Publicize top recruiters; meeting with Mayor; etc. o Provide valuable content that will command word of mouth

Figure (7-13)

D Implications

tent and information to generate he ICD site

CD site traffic and successful online l be directly correlated

visitor is a potential volunteer and / mmunity member

zation needs to be efficient and

tion combined with unique and ontent will help keep visitors on the increases possibility of a visitor work and partner organizations

l ICD sites and information on portunities should be easy to find

nformation on the benefits that d to communities and thereby o join for non-members

studies on select ICD launches and levelopments and successful

st of ICD networks in various cities nities

new members and volunteers

pond to inquiries for information

mation on the local area contacts for hat requests more information

from individuals interested in network & joining local community s

Recruiting through other 3rd Party Websites

Figure (7-14)

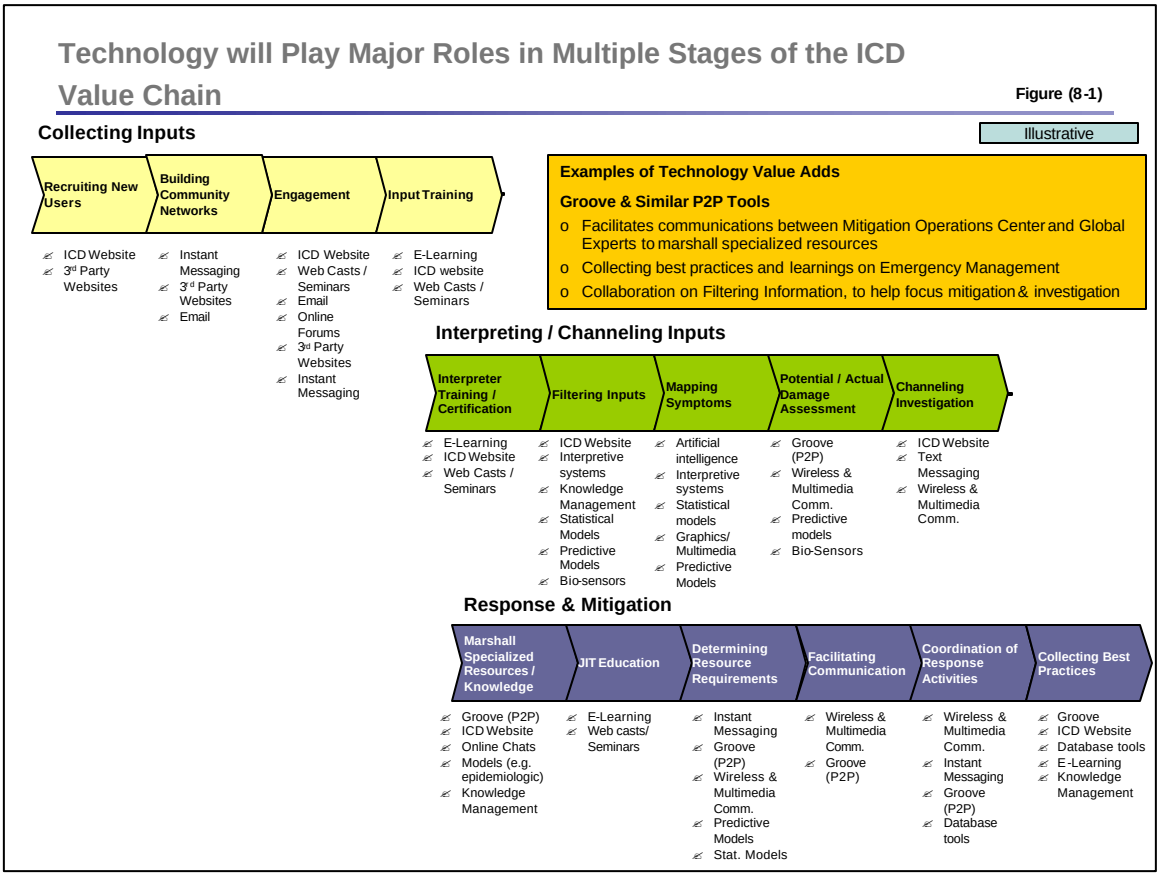
Collaborating with 3rd party websites to drive ICD website traffic will dramatically expand ICD's reach and presence and help expand ICD networks

- o Sites such as MSN, AOL, CNN and Yahoo! have access to a majority of the Internet population
  - ✍ Having direct links from the 3 major portals would dramatically increase the number of visitors to ICD and potential volunteers and network members (e.g. button that enables reporting anomalies via ICD; also provides access to real-time information in event of crisis)
  - ✍ Leverage DARPA/FEMA/ARC involvement to approach them; give them visibility as ICD partners
  - ✍ Create incentives for 3rd party partners: Access to dedicated ICD user base; share some unique content (e.g. Nobel lecture, or corporate-sponsored webcast)
- o Gauge national and local area sentiment and receive feedback on issues related to ICD
  - ✍ ICD can use other sites to poll how safe people feel; where/why they feel vulnerable; what information families would like to have
  - ✍ Use online communities on Craigslist to gauge level of enthusiasm of having ICD implemented in their neighborhoods and plant the seeds for future implementations
- o Use local online communities build up a volunteer base for new and existing implementations and drive new members for partner organizations
  - ✍ List volunteer opportunities on sites such as Craigslist for in cities with current and planned networks
    - ✍ For planned implementations, establish a base of volunteers that is ready to be deployed when ICD begins the launch
  - ✍ Browse through posted resumes for paid positions within ICD
- o Prominently advertise high profile launches and success stories and to drive ICD website traffic

VIII. Technology Enablers

ICD will employ both "High Tech" and "High Touch" to help achieve a safer and more secure nation. "High Touch" involves building multiple community-based networks that grow in scope to encompass both physical communities and "virtual" communities – such as worldwide citizens and professionals concerned with Industrial Safety or with Public Health. "High Tech" is a key enabler for these communities to stay in touch and interact in innovative ways. For example, in his recent book, *Emergence*, Steven Johnson predicts that in the foreseeable future: "we will also be collaborating on a scale rivaled only by the cities we first started building six thousand years ago … Almost every region of our cultural life was transformed by the power grid; the power of self-organization – coupled with the connective technology of the Internet – will usher in a revolution every bit as significant. It will transform our very definition of a media experience …" But High Tech also cuts across a multiplicity of points in the Value Chain, beyond network building.

Figure 8-1 shows a variety of technologies that apply across the ICD Value Chain. For example, E-learning technology will help develop higher-impact on-line accreditation programs for on-the-ground volunteers, and to spread best practices. Peer-to-Peer technologies (such as Groove, or the DCTS systems being developed by MITRE) help groups interact, exchange documents, and manage projects in a secure, documented environment. Such P2P tools can help with Damage Assessment, maintaining the Global Expert Network, Determining Response Resource Requirements, and collecting Best Practices, among other Value Chain processes. In fact, the ICD working team successfully used the Groove system during the course of project development to share documents and trigger exchange of ideas.



Predictive models will have numerous applications – including Damage Assessment, Filtering Information and Mapping Symptoms, and projecting Resource Requirements. Bio-sensor technology can enable both Damage Assessment and long-term Health Monitoring. Knowledge Management tools will support the Expert Network. Wireless and Multimedia technologies will foster tighter communications in the field of response. A variety of Artificial Intelligence (AI) tools will enable better and faster Filtering of Information, which coupled to Graphics and Display tools will help map symptoms and yield earlier detection of threats.

Figure 8-2 arrays the various technologies across the overall Value Chain to show their applicability. As ICD is rolled out nationally, there will need to be active development and incorporation of new technologies to continually make the ICD system more usable and, especially, more powerful to mitigate national threats. Section V describing the Information Fusion Center (IFC) earlier made the crucial point that the ICD Value Chain has been designed from the start with the view that new technologies will overlay on the defined processes to yield more sophisticated and valuable capabilities over time – not to obsolete the overall design. ICD will need to maintain a variety of external relationships to stay abreast of relevant technologies and continually update a timeline for rolling in new technologies. To accomplish that, ICD will need an internal team of application developers to execute select software projects, along with project management skills and ability to direct work of multiple outside vendors.

Matrix of Various Technologies used in the ICD Value Chain

Figure (8-2)

Technology Types	Collecting Inputs				Interpreting / Channeling Inputs					Response & Mitigation					
	Recruiting New Users	Building Community Networks	Engagement	Input Training	Interpreter Training / Certification	Filtering Inputs	Mapping Symptoms	Potential / Actual Damage Assessment	Channeling Investigation	Marshall Specialized Resources / Knowledge	JIT Education	Determining Resource Requirements	Facilitating Communication	Coordination of Response Activities	Collecting Best Practices
ICD Website	x		x	x	x	x			x	x					x
3rd Party Websites	x	x	x												
Instant Messaging		x	x									x		x	
Email		x	x												
Web Casts / Seminars			x	x	x						x				
Online Forums / Chats			x							x					
E-Learning				x	x						x				x
Interpretative Systems						x	x								
Statistical Models						x	x					x			
Graphics / Multimedia							x								
Groove (P2P)								x		x		x	x	x	x
Artificial Intelligence							x								
Wireless & Multimedia Comm.								x	x			x	x	x	
Text Messaging									x						
Models (e.g. Epidemiologic)										x					
Knowledge Management						x				x					x
Predictive Models						x	x					x			
Database Tools														x	x
Bio-Sensors						x		x							

DARPA-developed technologies should continue to be a rich source of new ICD capabilities. Figure 8-3 shows applicability of some of the DARPA technologies currently being developed in the Information Awareness Office (IAO). Several of the technologies have promise to significantly boost effectiveness of the overall ICD processes for Interpreting/Channeling Inputs, and for Response & Mitigation. For example, the Genoa II program is developing powerful tools for collaboration across analyst teams, including scenario development and options screening and evaluation. The Communicator program is already commercial in both Military and civilian applications, and could yield valuable capabilities such as (1) expert advisory systems to guide dangerous field response activities – similar in objectives to the current F-18 "Maintenance Mentor"; and (2) triggering "alarms" for health risks and potential bio-terrorist acts. The Genisys database system could elevate the overall analysis and integration process within the IFC by substantially increasing the "structured" and usable content of complex databases. The Babylon language translation program, originally designed for Military field use, could help to communicate with non-English speaking victims, and on-the-ground observers, during a crisis.

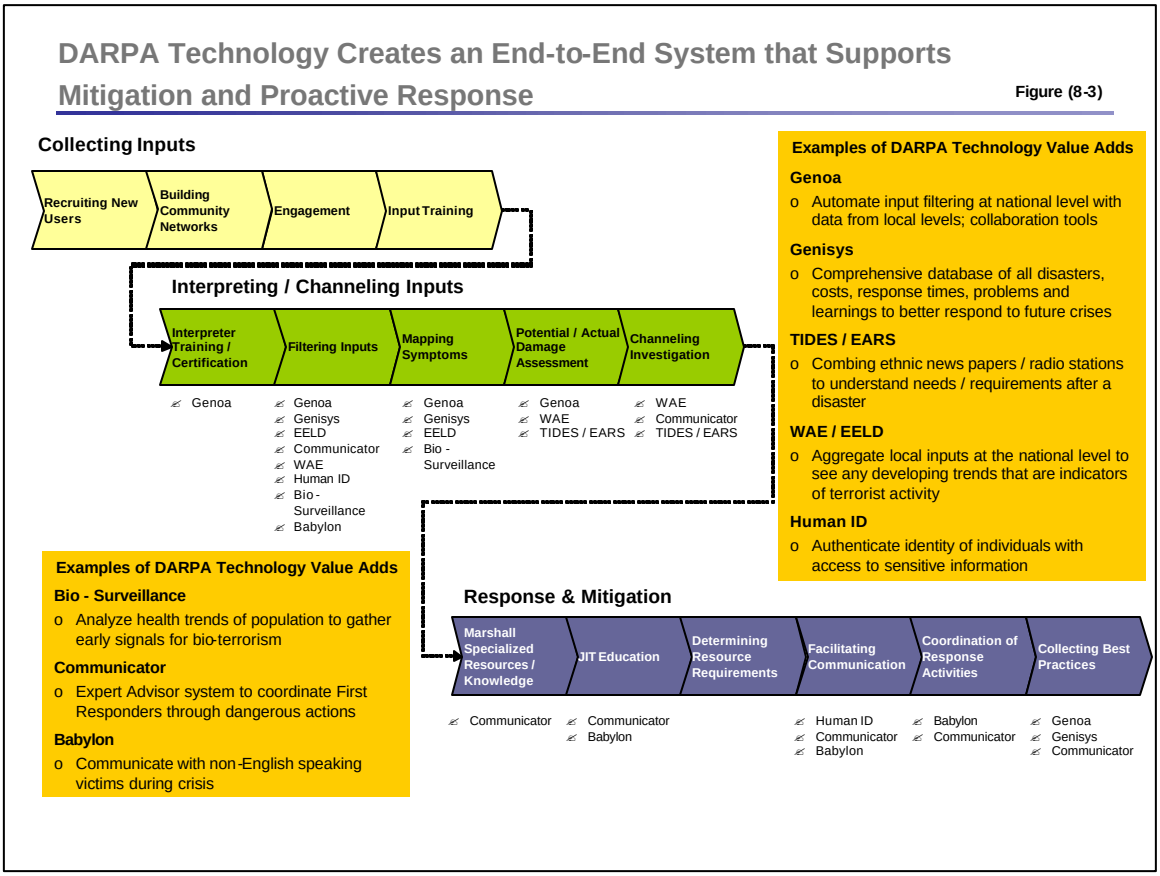


Figure 8-4 presents a matrix of the DARPA technologies arrayed against the various stages of the Value Chain, to show visually which technologies could cut across Value Chain activities.

Matrix of DARPA Technologies applicable to the ICD Value Chain

Figure (8-4)

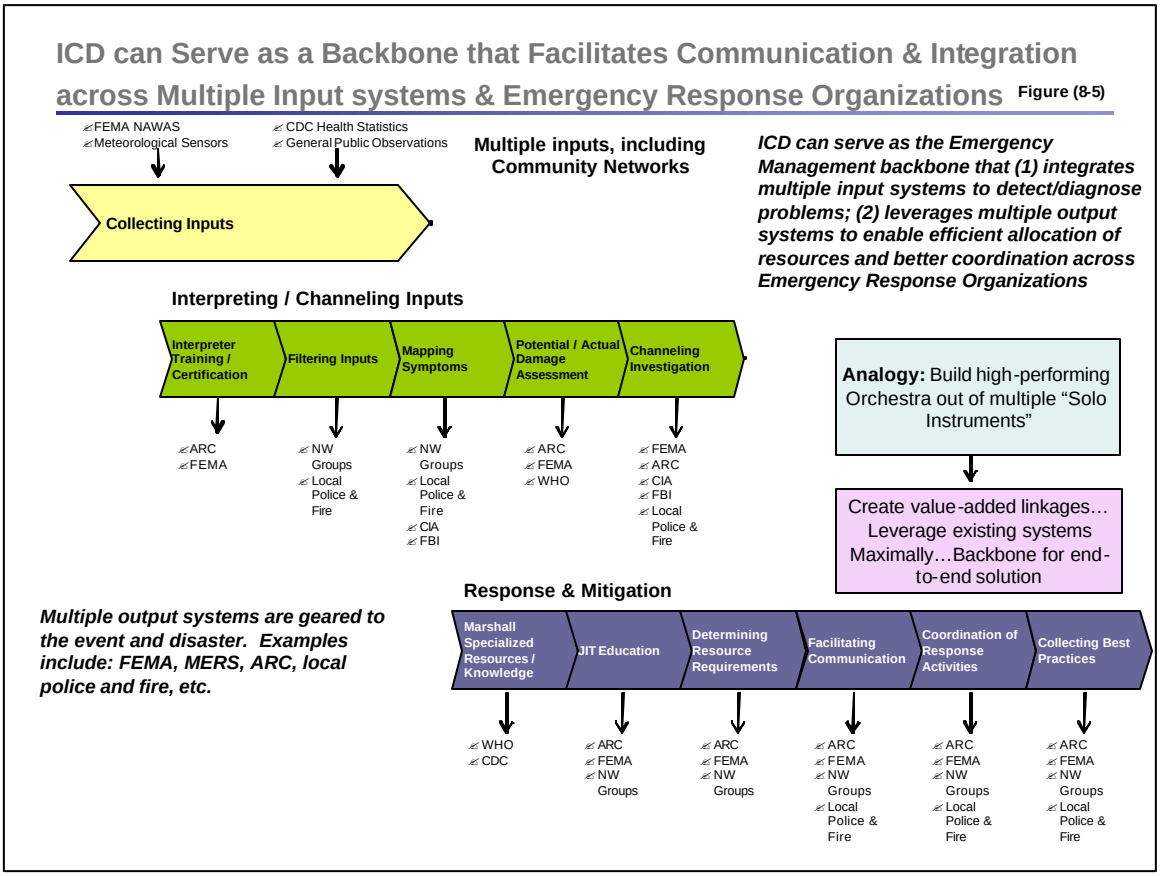
Preliminary

DARPA Technologies	Interpreting / Channeling Inputs					Response & Mitigation					
	Interpreter Training / Certification	Filtering Inputs	Mapping Symptoms	Potential / Actual Damage Assessment	Channeling Investigation	Marshall Specialized Resources / Knowledge	JIT Education	Determining Resource Requirements	Facilitating Communication	Coordination of Response Activites	Collecting Best Practices
Genoa	x	x	x	x							x
Genisys		x	x								x
EELD		x	x								
WAE		x		x	x						
Human ID		x							x		
Bio-Surveillance		x	x								
Babylon		x					x		x	x	
TIDES / EARS				x	x						
Communicator		x			x	x	x		x	x	x

- Multiple DARPA technologies look attractive to leverage within ICD
- Genoa, Communicator, and WAE may have greatest applicability for Interpreting/Channeling … Babylon and Communicator for Response & Mitigation

Figure 8-5 shows one final technology-driven vision for ICD that could emerge over time. Namely, today, the nation has multiple "input" systems that provide valuable status alerts. These include the FEMA NAWAS system, Meteorological sensors, other deployable sensor systems being developed, and CDC Health statistics, among others. Likewise, there are multiple "output" and communication systems that provide notification alerts; these include the FEMA MERS system and new programs to enhance mobile communications for the first responders. ICD could provide the "backbone" to tie together these multiple input and output systems to deliver a range of benefits:

- Use the inputs to help drive better and earlier detection for mitigation operations;
- Connect both the inputs and outputs to the Internet;
- In turn, connect these to the Information Fusion Center, to the Global Experts Network, and to the On-the-Ground Observers;
- Provide fast and effective links to public education and local notification systems.



Without coordination, the nation risks inefficient spending of scarce resources by investing in multiple input/output systems that serve useful localized needs, but don't really mesh with, or contribute to, an overall system of Homeland Defense and Emergency Management. On the positive side, coordinating these developments to be compatible with and contribute to ICD can help to create a high-performing "Orchestra" out of multiple "Solo Instruments." In a similar social vein, jazz performers can often integrate their individual skills/talents on the spot, as long as the coordinating vehicle is in place.

IX. Information Technology Architecture & Security Issues

This section presents a high-level view of the ICD Architecture from an Information Technology (IT) perspective. The objective is to show how the ICD Architecture could actually be implemented; how IT security issues can be managed; and generally, to lay out a roadmap that could guide more detailed implementation work. Consistent with the thrust of a Feasibility Study, we focus at the overall architecture level rather than at the systems design level.

Figure 9-1 lays out the IT Architecture in terms of "Public" and "Restricted Access" layers. Each layer has a protective boundary – "DMZ" in IT-security parlance – with the tightest security surrounding the restricted layer. The Public layer would house the Public Portal, including content, e-mail features, dialogues, on-line learning systems, and public databases containing, for example, aggregate public health data. The restricted layers would house highly proprietary IFC databases and analysis tools such as AI models and other data-filtering technologies. The restricted layer would also include Best Practice databases; P2P tools for the Global Expert network and Best Practice networks; secure communications across government agencies using and inputting to the IFC; and Authentication functionality, Security Management and Certificate Management.

Potential ICD Information Systems Architecture Separates Public vs. Restricted Layers

Figure (9-1)

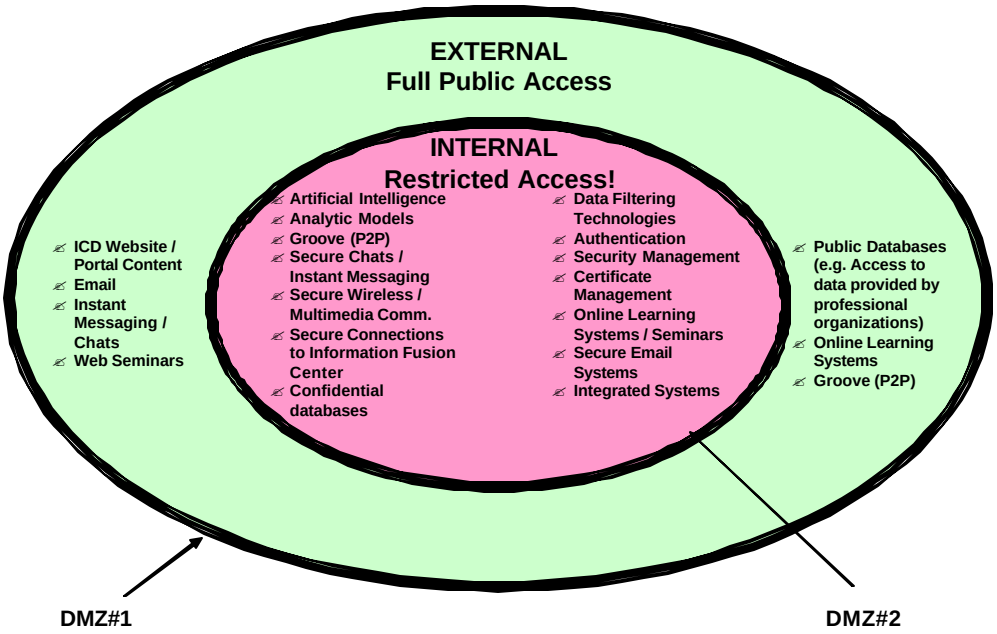
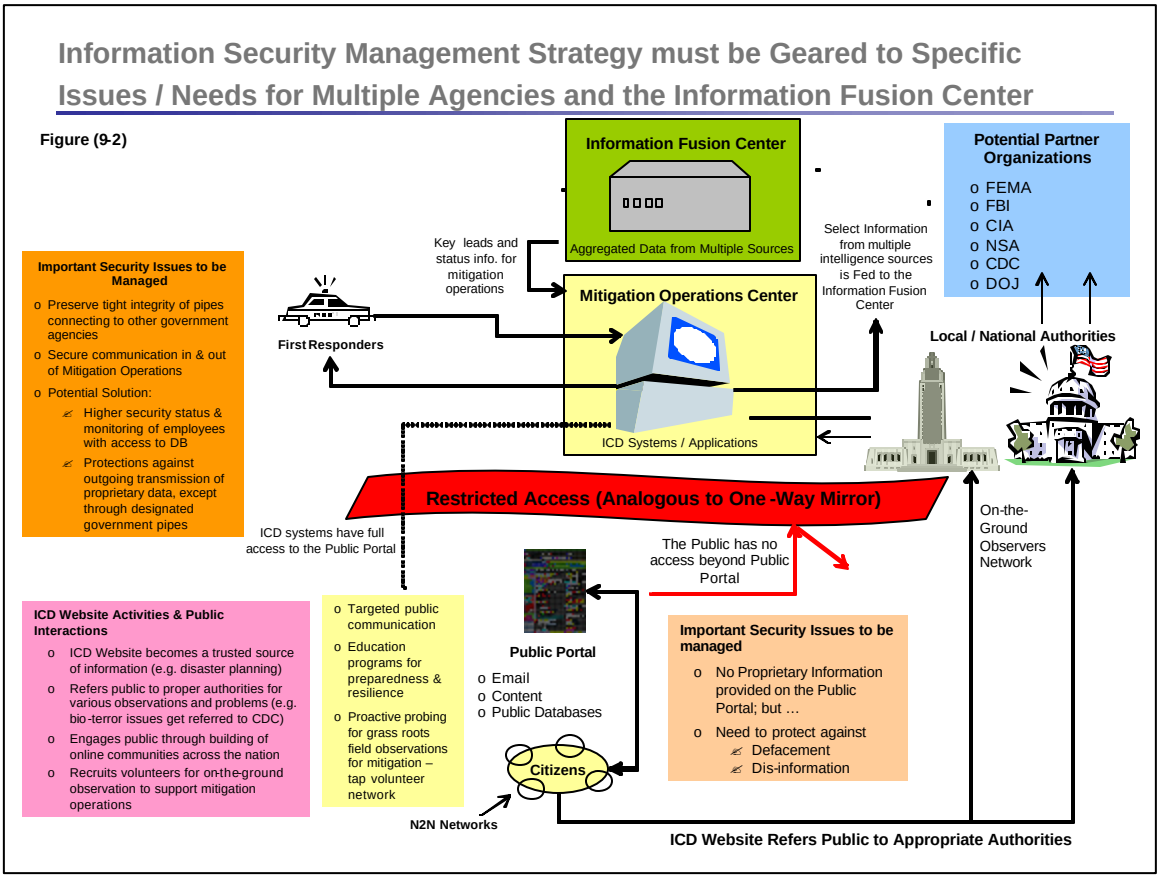


Figure 9-2 shows the IT Architecture more visually, highlighting the three core ICD modules: Neighborhood Network Building & the Public Portal, IFC, and MOC.



The Public Portal will not contain any proprietary databases, only information that is intended to be shared with, and accessed by, the general public. The Portal will include a website, e-mail, content, and other public databases. However, IT security issues to be managed include avoiding defacement or dis-information – especially during a crisis.

The middle of the diagram portrays a Restricted Access "one-way mirror," signifying that users of the Public Portal would not have any access or purview to the top systems; but the IFC and MOC would have full access to the Public Portal. In fact, the IFC and MOC would reside on entirely separate systems.

The IFC would interact with two main sets of users: (1) the "core" partner agencies who would be intensively involved in day-to-day analysis activities involving regular access in and out of the ICD database; and (2) the "inputting" agencies who would mainly provide data to IFC, and would receive back alerts, select "slices" of data, and other reports and information. The primary security issue would be secure communications, which can be addressed with dedicated "pipes" connecting to the core agencies. FEMA/DHS could act as a "hub" for the inputting agencies via VPN currently being created.

As discussed in Section V, connectivity across agencies would be achieved with integration software, including brokers and adapters, via Web Services, or using a combination approach. For example, in a new book, *Out of the Box*, John Hagel describes benefits of connectivity via Web services:

"The advent of Web services promises to let a company connect its applications to any number of trading partners relatively inexpensively and easily …Dell is one of the companies that have already started to [use] Web services [in its] core activities. In 2000, the company began sending components specifications to its suppliers in a Web services format so that the suppliers' inventory-management systems could read the data automatically. That move helped Dell reduce the inventories of components at its many geographically distributed assembly plants by more than 80 percent—from 26 to 30 hours of production down to 3 to 5 hours."

Any employees/analysts "touching" the proprietary databases would also need defined security clearance and authentication procedures.

The MOC will need secure communications with the First Responders and with the On-the-Ground Volunteers. MOC will also maintain select databases – including Best Practices and, potentially, Long-term Health Tracking. MOC will receive inputs from the IFC, such as status reports, and will, reciprocally, provide select leads to the IFC based on field observations. The MOC may also need to create verification procedures for identities of the On-the-Ground Coordinators

The IFC and MOC databases serve distinct purposes – broadly, information synthesis vs. mitigation support and information – and are best viewed as geographically distinct, housed in separate computer systems.

X. Implementation Criteria and Scenarios

Overall Ranking Criteria and preliminary Screening of Candidates

What organization(s) would be the best institutional "hosts" for ICD?

To help answer that question, we developed a ranking system based on four categories of criteria:

- Reputation
- Human Resources base
- Infrastructure
- Capabilities

Figure 10-1 lays out the ranking criteria. For example, Reputational criteria include: Brand equity of Integrity, and Recognition as a "Good Neighbor," plus Compatibility with Organizational Mission, and Financial Sustainability and Public Accountability. Infrastructure criteria include: Ability to mobilize and manage a Service Center to support the Public Portal, ideally leveraging existing infrastructure; and pervasive Internet access. Capabilities surround Network building skills; experience in Emergency Management; strength of Relationships with First Responders and with community-based organizations; IT systems sophistication; and Marketing capacity to engage the public on a continuing basis.

Ranking Criteria embody Potential Success Factors for New ICD Architecture

Figure (10-1)

Preliminary; for discussion

Ranking Criteria Key:

Reputation		**Scope**
Reputation 1	Brand equity of Integrity	Both
Reputation 2	Recognition as "Good Neighbors"	Both
Reputation 3	Compatibility with Organization Mission	Both
Reputation 4	Financial sustainability & public accountability (including effectiveness of accounting system)	Both
Human Resources		
Human Resources 1	Evergreen trained volunteer base	Both
Human Resources 2	Experience in developing & delivering certification programs	Both
Infrastructure		
Infrastructure 1	Ability to create service center & leverage existing technology to minimize cost & speed implementation	Operations
Infrastructure 2	Pervasive Internet access	Both
Infrastructure 3	Ability to create & manage effective public portal	Education
Capabilities		
Capabilities 1	Capacity to attract, build, nurture a citizens network & "zoom" in to coordinate at the community level	Both
Capabilities 2	IT systems sophistication to incorporate forecasting systems & other advanced technology	Operations
Capabilities 3	Ability to connect to other community based preparedness organizations (e.g. NW, Citizens Corp)	Education
Capabilities 4	Ability to connect to other Emergency Service Providers (e.g. Fire Departments)	Operations
Capabilities 5	Accumulated experience in managing disasters	Both
Capabilities 6	Ability to develop & deliver public education programs	Education
Capabilities 7	Ability to create organization for effective hierarchy of networks	Both
Capabilities 8	Marketing ability and capacity to engage the public	Education

Notes:
(1) Rankings range from 1 - 5 with 5 being best and 1 being worst
(2) Scope represents types of activities embodied within each criterion.
(3) Education = Education oriented activities; Operations = Operations oriented activities

Figure 10-2 uses the criteria to rate a variety of organizations as attractive institutional hosts for ICD. We developed two sets of rankings: One by averaging out each organization's scores on the 17 total ranking criteria; and a second set by calculating category averages (e.g. for Reputation, HR, Infrastructure, Capabilities), which were then averaged out (weighing each category equally). We also rated a number of combined leadership models, such as FEMA/ARC partnership, or ARC/NW partnership.

With ranking criteria, ARC / FEMA / DHS Emerge as strong candidates for overall leadership of ICD Value Chain

Figure (10-2)

Preliminary; for discussion

Overview of Institutional Candidates

	ARC	FEMA	Salvation Army	Citizen Corps	Nat'l NW	DHS	DOJ	FEMA / NW	ARC / FEMA	ARC / NW
Reputation 1	4	3	3	2	3	3	3	3	4	4
Reputation 2	4	2	3	2	4	4	3	4	4	4
Reputation 3*	3	4	3	3	4	5	4	5	5	4
Reputation 4	4	5	3	3	4	5	5	5	5	4
Human Resources 1	3	1	2	2	4	2	1	3	4	5
Human Resources 2	5	2	2	2	3	2	1	3	5	5
Infrastructure 1	4	5	1	1	1	4	4	5	5	4
Infrastructure 2	3	5	2	1	2	5	4	5	5	3
Infrastructure 3	4	3	2	3	4	4	3	4	4	4
Capabilities 1	3	3	1	1	1	4	4	3	4	3
Capabilities 2	3	5	1	1	1	4	4	5	5	3
Capabilities 3	4	3	2	4	4	4	4	3	4	4
Capabilities 4	4	5	2	2	3	4	4	5	5	4
Capabilities 5	5	5	3	1	3	4	3	5	5	5
Capabilities 6	4	3	1	3	4	3	2	4	5	4
Capabilities 7	3	4	3	2	2	4	4	4	4	3
Capabilities 8	3	2	3	3	4	3	2	4	4	5
General Average	**3.7**	**3.5**	**2.2**	**2.1**	**3.0**	**3.8**	**3.2**	**4.1**	**4.5**	**4.0**
Category Averages										
Reputation	3.8	3.5	3.0	2.5	3.8	4.3	3.8	4.3	4.5	4.0
Human Resources	4.0	1.5	2.0	2.0	3.5	2.0	1.0	3.0	4.5	5.0
Infrastructure	3.5	5.0	1.5	1.0	1.5	4.5	4.0	5.0	5.0	3.5
Capabilities	3.6	3.8	2.0	2.1	2.8	3.8	3.4	4.1	4.5	3.9
Average of Category Averages	**3.7**	**3.4**	**2.1**	**1.9**	**2.9**	**3.6**	**3.0**	**4.1**	**4.6**	**4.1**

Notes: *ARC receives a 2 for operations oriented activities and 4 for education oriented activities.

We should emphasize that the above results are subjective, and reflect the particular viewpoints of the team. We urge individuals to develop their own rankings, using the template attached in Figure 10-3.

Organizations Should Develop their Own Rankings Based on the Criteria Listed

Figure (10-3)

Preliminary; for discussion

Please rank your Organization's capabilities for each of the categories listed below on a scale of 1 - 5 (5=Best, 1=Worst)	
Brand equity of Integrity	
Recognition as "Good Neighbors"	
Compatibility with Organization Mission	
Financial sustainability & public accountability (including effectiveness of accounting system)	
Evergreen trained volunteer base	
Experience in developing & delivering certification programs	
Pervasive Internet access	
Ability to create & manage effective public portal	
Capacity to attract, build, nurture a citizens network & "zoom" in to coordinate at the community level	
Ability to connect to other community based preparedness organizations (e.g. NW, Citizens Corp)	
Accumulated experience in managing disasters	
Ability to develop & deliver public education programs	
Ability to create organization for effective hierarchy of networks	
Marketing ability and capacity to engage the public	
Ability to create service center & leverage existing technology to minimize cost & speed implementation	
IT systems sophistication to incorporate forecasting systems & other advanced technology	
Ability to connect to other Emergency Service Providers (e.g. Fire Departments)	
Average	

Nonetheless, the results are striking: FEMA/DHS and ARC emerge as the clear favorites to host ICD out of the individual institutions; and FEMA/ARC partnership receives the highest overall scores.

Figures 10-4 and 10-5 take a refined cut at the rankings. Figure 10-4 ranks the institutions as candidates to lead the “front end” ICD processes surrounding the Public Portal. Figure 10-5 similarly rates attractiveness of organizations to lead the “back end,” operations-oriented processes. The reason to separate out these ratings revolves primarily around different skill sets that organizations have for educationally-focused vs. operations-oriented activities.

ARC emerges as the leader for the Education-Oriented Activities, with the ARC / FEMA combination being the strongest

Figure (10-4)

Preliminary; for discussion

Overview of Institutional Candidates - Education Oriented Activities

	ARC	FEMA	Salvation Army	Citizen Corps	Nat'l NW	DHS	DOJ	FEMA / NW	ARC / FEMA	ARC / NW
Reputation 1	4	3	3	2	3	3	3	3	4	4
Reputation 2	4	2	3	2	4	4	3	4	4	4
Reputation 3	3	4	3	3	4	5	4	5	5	4
Reputation 4	4	5	3	3	4	5	5	5	5	4
Human Resources 1	3	1	2	2	4	2	1	3	4	5
Human Resources 2	5	2	2	2	3	2	1	3	5	5
Infrastructure 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Infrastructure 2	3	5	2	1	2	5	4	5	5	3
Infrastructure 3	4	3	2	3	4	4	3	4	4	4
Capabilities 1	3	3	1	1	1	4	4	3	4	3
Capabilities 2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capabilities 3	4	3	2	4	4	4	4	3	4	4
Capabilities 4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capabilities 5	5	5	3	1	3	4	3	5	5	5
Capabilities 6	4	3	1	3	4	3	2	4	5	4
Capabilities 7	3	4	3	2	2	4	4	4	4	3
Capabilities 8	3	2	3	3	4	3	2	4	4	5
General Average	**3.7**	**3.2**	**2.4**	**2.3**	**3.3**	**3.7**	**3.1**	**3.9**	**4.4**	**4.1**
Category Averages										
Reputation	3.8	3.5	3.0	2.5	3.8	4.3	3.8	4.3	4.5	4.0
Human Resources	4.0	1.5	2.0	2.0	3.5	2.0	1.0	3.0	4.5	5.0
Infrastructure	3.0	5.0	2.0	1.0	2.0	5.0	4.0	5.0	5.0	3.0
Capabilities	3.7	3.3	2.2	2.3	3.0	3.7	3.2	3.8	4.3	4.0
Average of Category Averages	**3.6**	**3.3**	**2.3**	**2.0**	**3.1**	**3.7**	**3.0**	**4.0**	**4.6**	**4.0**

Note:

(1) NA = Not Applicable

FEMA emerges as the leader for the Operations Oriented Activities, with the ARC / FEMA combination being the strongest

Figure (10-5)

Preliminary; for discussion

Overview of Institutional Candidates - Operations Oriented Activities

	ARC	FEMA	Salvation Army	Citizen Corps	Nat'l NW	DHS	DOJ	FEMA / NW	ARC / FEMA	ARC / NW
Reputation 1	4	3	3	2	3	3	3	3	4	4
Reputation 2	4	2	3	2	4	4	3	4	4	4
Reputation 3	3	4	3	3	4	5	4	5	5	4
Reputation 4	4	5	3	3	4	5	5	5	5	4
Human Resources 1	3	1	2	2	4	2	1	3	4	5
Human Resources 2	5	2	2	2	3	2	1	3	5	5
Infrastructure 1	4	5	1	1	1	4	4	5	5	4
Infrastructure 2	3	5	2	1	2	5	4	5	5	3
Infrastructure 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capabilities 1	3	3	1	1	1	4	4	3	4	3
Capabilities 2	3	5	1	1	1	4	4	5	5	3
Capabilities 3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capabilities 4	4	5	2	2	3	4	4	5	5	4
Capabilities 5	5	5	3	1	3	4	3	5	5	5
Capabilities 6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Capabilities 7	3	4	3	2	2	4	4	4	4	3
Capabilities 8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
General Average	**3.7**	**3.8**	**2.2**	**1.8**	**2.7**	**3.8**	**3.4**	**4.2**	**4.6**	**3.9**
Category Averages										
Reputation	3.8	3.5	3.0	2.5	3.8	4.3	3.8	4.3	4.5	4.0
Human Resources	4.0	1.5	2.0	2.0	3.5	2.0	1.0	3.0	4.5	5.0
Infrastructure	3.5	5.0	1.5	1.0	1.5	4.5	4.0	5.0	5.0	3.5
Capabilities	3.6	4.4	2.0	1.4	2.0	4.0	3.8	4.4	4.6	3.6
Average of Category Averages	**3.7**	**3.6**	**2.1**	**1.7**	**2.7**	**3.7**	**3.1**	**4.2**	**4.7**	**4.0**

Note:
(1) NA = Not Applicable

Figure 10-4 concludes that ARC has the strongest individual scores in the education-oriented processes, while FEMA/ARC partnership rates highest overall. Figure 10-5 concludes that FEMA/DHS is the strongest sole candidate for operations leadership, with FEMA/ARC partnership ranked overall highest.

These results, summarized in Figure 10-6, broadly suggest that FEMA/ARC partnering is very attractive for implementing ICD. That partnering could be achieved via a number of specific scenarios, and corresponding working relationships and divisions of labor; for example:

- ARC could lead in sponsoring the Public Portal, with FEMA support, potentially as part of an NGO structure; and FEMA/DHS could lead the operations-oriented processes of the IFC and MOC; or
- FEMA/DHS could lead overall ICD, with significant ARC participation in the Public Portal – for example, to deliver public education and family preparedness models – and in the MOC, especially to collect, validate and disseminate Best Practices.

The ICD Implementation Workshops described later in this section have helped to flesh out partnering models and potential partner contributions.

Conclusions

Figure (10-6)

ARC & FEMA/DHS are emerging as the clear leaders to lead ICD implementation

Each organization brings specific skills that will be valuable for ICD:

- ARC emerges as the strongest candidate to lead the education oriented activities
- FEMA/DHS is front runner to lead the operations oriented activities
- Hybrid, joint leadership, model has highest overall scores, by combining complementary capabilities
- New DHS mission & skills will enhance ICD Implementation further

Other organizations, such as NW and Citizen Corps, have expertise that can be tapped during implementation process to accelerate public network building

Successful outcome is dependent on strong communication and coordination between the leadership agencies

ARC Implementation Workshop

The following pages for Figure 10-7 present results of an Implementation Workshop run with a broad ARC team spanning Disaster Services, Communications, Community Disaster Education, and other functions.

ARC Implementation Spans Key Value Chain Activities for Recruiting, Network Building, Training & JIT Public Education

Figure (10-7a)

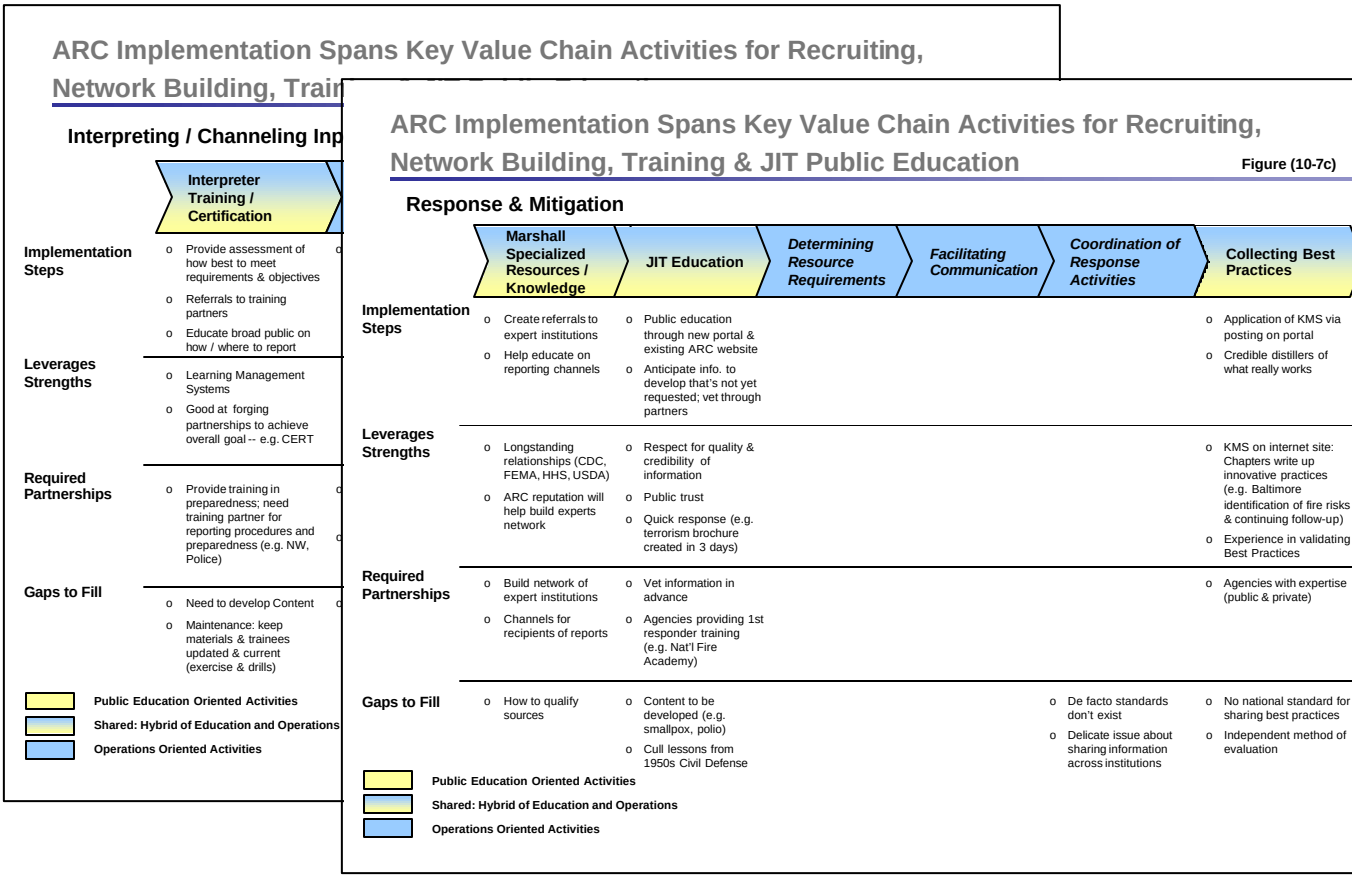
Collecting Inputs

	Recruiting New Users	Building Community Networks	Engagement	Input Training
Implementation Steps	o Get marketing & promotional information out	o Get word out in 1000 local chapters; have them promote in the communities; ask them to make info available o Turnkey method: Simple to implement; package (e.g. Presenter's Guide) o Intro's to MMRS, LEPC	o Information referral role o Local Chapter exec's provide content; participate in talk shows; share messages o Topical discussions o Nat'l Preparedness TV channel o Measure public mood	o Presentations for public on issues of current concern -- create awareness (e.g. smallpox) o Provide information quickly to rep's through web, e-mail
Leverages Strengths	o ARC "Seal of approval"; engender public confidence	o Good network of people who can package – usable, simple (CDE is strong precedent)	o Providing consistent & accurate referrals; trust-based relationships o ARC Presence in 900 communities o ARC has 1.2M instructors in Health & Safety	o Powerful intranet o "Push" e-mails on anthrax, gas masks, combatting fear, West Nile
Required Partnerships	o Existing ARC networks o Natural ICD Interest groups, including NW, Citizen Corps and professional organizations involved in security/health/safety	o Already included in Citizen Corps, other existing community networks o Relations with other community - based organizations (e.g. California); create local coalitions	o Weather Channel & Discovery Channel are ARC partners in documentaries (how to get better prepared) o Create Corporate Sponsorships -- in their interest to participate & provide private funding (+ public)	o Professional organizations with requisite knowledge -- CDC; new CDC partnership in bio- terrorism o Joint logo materials: USFA, FEMA
Gaps to Fill	o Be very clear about ARC role & involvement o Define interface with FEMA	o Reputational risk if ICD doesn't get off the ground	o Govt. must create Info. Fusion Center -- or create unfulfilled expectations, loss of confidence o Seamless, simple way to provide information	o Ability to respond quickly in conjunction with partner agencies o Identify correct constellation of partners

Public Education Oriented Activities

Shared: Hybrid of Education and Operations

Operations Oriented Activities



The workshop format involved walking through all the ICD Value Chain activities. Participants identified those activities that fit best with ARC skills. Figure 10-7 then identifies four items for each Value Chain step: (1) What would ARC do to implement that activity? (2) What ARC strengths would that activity delivery leverage? (3) What partnerships would ARC require to execute at a high level of service? (4) What gaps would remain to be filled?

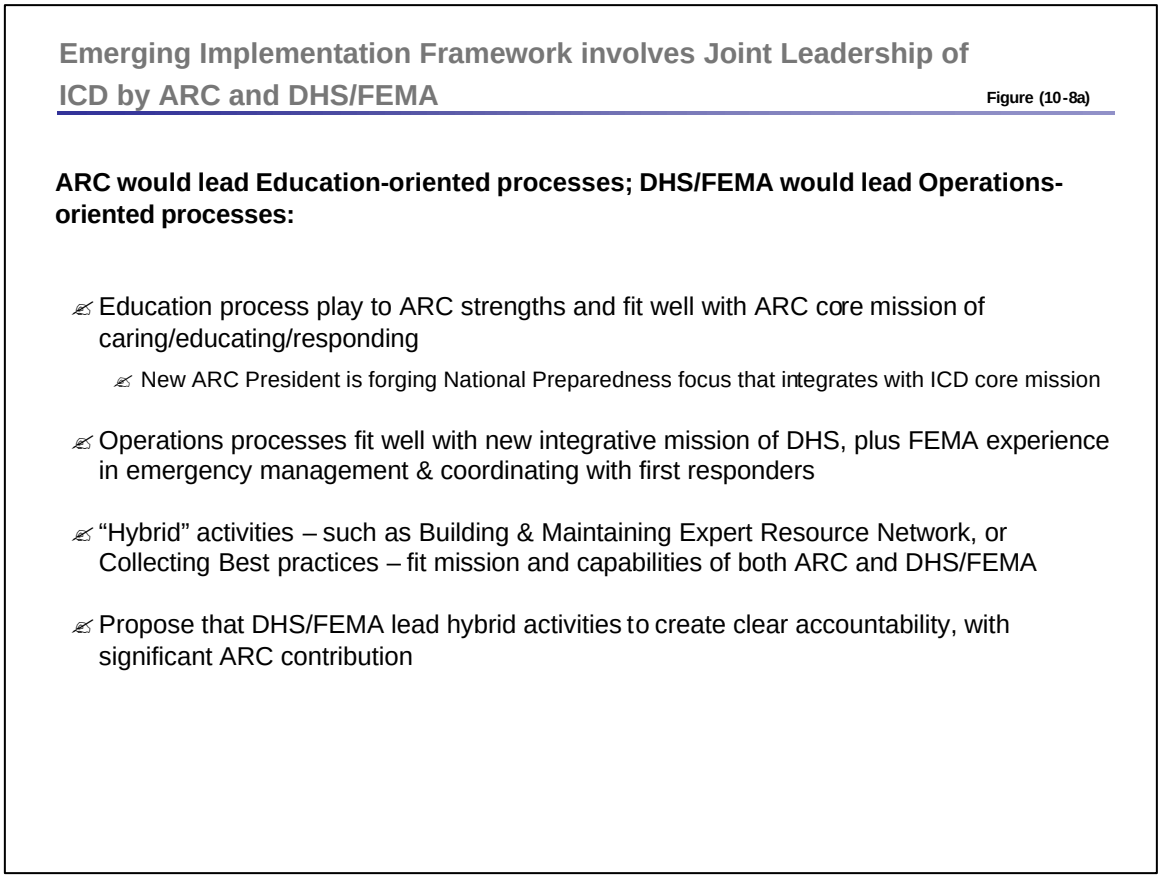
The exercise highlighted a number of considerable strengths that ARC brings to education-oriented processes, including:

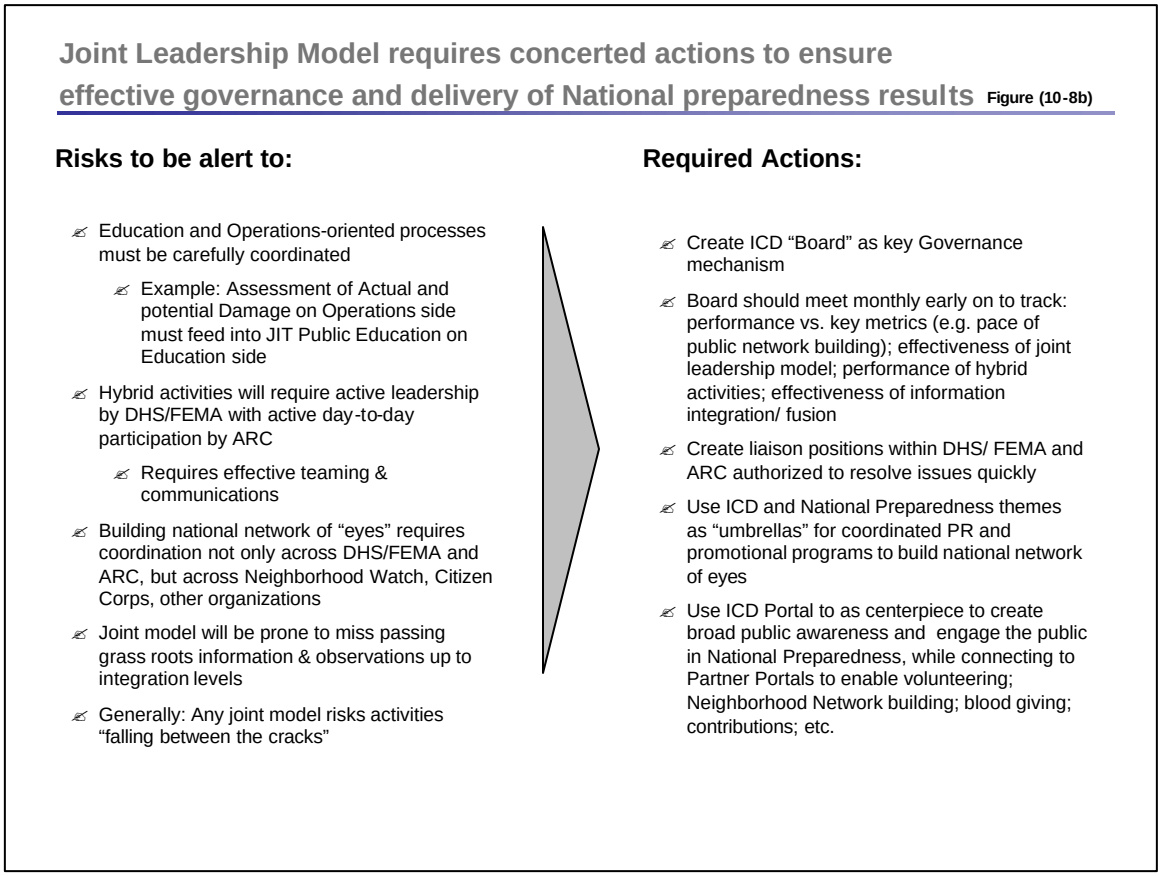
- Presence in 1,000 local chapters
- 1.2M trainers in Health & Safety
- Public reputation as a trusted & credible source of information
- ARC "seal of approval" engenders public confidence
- Experience in developing "turnkey" training/education materials
- Powerful intranet and website capabilities
- Experience with "push" e-mails on anthrax, West Nile, and other topics
- Specific experience in education for fear management
- Partnerships and joint logo materials with FEMA, HHS, USDA, CDC, others
- Knowledge Management System that culls and validates Best practices; strong practical experience with understanding "what really works"

The ARC workshop led to distinguishing 3 sets of processes within the ICD Value Chain, distinguished by customer/consumer, and by activity type:

- **Education-oriented processes** include: Recruiting, Network building, Engagement, and JIT Public Education
- **Operations-oriented Processes** include: Filtering Information & Mapping Symptoms; Channeling Investigation; Coordinating Response Activities
- **Hybrid activities** with joint educational and operations "flavor" include: Marshalling Specialized Resources and Knowledge; and Collecting Best Practices.

Figure 10-8 summarizes conclusions from the ARC Working Session.





FEMA Implementation Workshops

Parallel Implementation Workshops were run at FEMA. The first workshop participants comprised a relatively senior group at FEMA HQ, including representation from ONP, Citizen Corps, USFA, Communications, and IT. A second workshop was held at FEMA Mount Weather with an operations-oriented group with particular expertise in IT and information security.

Figure 10-9 summarizes the combined workshops, which yielded highly complementary viewpoints, building on one another. The results pinpointed significant potential FEMA contributions spread across the entire ICD Value Chain. This outcome is consistent with the high overall ranking for FEMA as an institutional host for ICD, as presented earlier in Figure 10-2. FEMA strengths that were highlighted included:

- Reputation as EM leader and coordinator for the Nation
- Potential for Citizen Corps affiliate program, including links to NW
- Historical housing/origin of Civil Defense activities within FEMA
- Strong interface between FEMA Regional offices and State and Regional EOC
- Extensive training infrastructure
- Educational assets including EENet, NETC
- Federal Response Operations doctrine grounding

- Damage assessment protocols and simulation tools, including Fire Academy and NETC SimLab
- Wide experience in collecting information and mapping plumes of emergent disaster situations
- Elevated responsibility for information integration as pending part of DHS

FEMA Implementation Framework for ICD

Figure (10-9a)

Collecting Inputs

	Recruiting New Users	Building Community Networks	Engagement	Input Training
Implementation Steps	o ICD affiliate program with Citizen Corps o Update FEMA publications to introduce ICD o Get NEMA, IAEM endorsement; NFPA; other EM & First Responder national prof. org's o Use FEMA.gov for outreach	o Give tangible basis to engage entire EM partnership o Develop "The Disaster Resistance Channel" (TV) o Add ICD to CERT curriculum o Presentations at NETC; eventually, add 1/2 day class	o Give credit to citizen tips o Create recognition for continuing participation (e.g. Govbenefits website) o Exposure to PTA/NETA; create curriculum for prevention in schools o Other independent study courses -- training on demand o Create highly reputable Board	o ICD Certification/credentialing program o Allied to other training courses, e.g. NETC o Publicize "success stories"
Leverages Strengths	o Citizen Corps programs/networks, including NW o FEMA is EM Leader and Coordinator of the Nation o Disasterhelp.gov	o EENet o Emergency Information Infrastructure Partnership (?) o Historical housing of CD within FEMA	o Citizen Corps o Interface between FEMA regional offices & State & ICD	o Training programs
Required Partnerships	o Freedom Corps? o National Assoc. of Broadcasters o Society of Broadcast Engineers o Children's TV Network; Sesame Street	o National organizations o 26 signatories to Federal Response Plan (HHS, DOJ, EPA, etc.) o DOD: DARPA/Northern Command o Industry o Partnership for Public Warning	o NFPA Risk Watch	o Children's TV Network o Coalition of Federal Agencies & Prof. Associations - TBD
Gaps to Fill				

Public Education Oriented Activities
Shared: Hybrid of Education and Operations
Operations Oriented Activities

FEMA Implementation Framework for ICD

Figure (10-9b)

Interpreting / Channeling Inputs

	Interpreter Training / Certification	*Filtering Inputs*	*Mapping Symptoms*	*Potential / Actual Damage Assessment*	*Channeling Investigation*
Implementation Steps	o ICD Analyst Certification o Document success stories o Access expertise of Call Center trainers; look at standards	o Develop essential elements of information o Deploy software & train people in it o Filters have to learn o Job engineering o Mandatory protocols for sharing information	o Master practitioners of Filtering o Pattern recognition o Develop analytical capabilities o "Think beyond the box" o Human-machine interface	o Review current capabilities in light of ICD Architecture o Support development of modified/new software	o Decision tree: What it is/Where it goes? o Keep open channels o Implement Information security
Leverages Strengths	o FEMA training infrastructure o Membership on Standards Committees	o Federal Response Operations doctrine o Current inter-agency coordination (e.g. Federal Response Plan); periodic meetings; HQ & regional level engagements	o Collection of information o Mapping plumes o Geographic Information Systems (GIS)	o Damage assessment protocols o Rapid Needs Assessment o Fire Academy simulators o NETC SimLab	o Public damage assessment
Required Partnerships	o Intelligence community o DHS o Dept. of Commerce o All information providers & recipients to Fusion Center	o DHS o All information providers & recipients to Fusion Center o Disasterhelp.gov partnerships	o DHS o EM Partnership o Existing analytical tools (e.g. DARPA, others)	o NIMA o NOAA o Forest Service o EM Partnership o Public Health officials	o DHS o EM Partnership o Public Health/HHS o Local officials
Gaps to Fill		o Staffing o Technology support o Improving horizontal interfaces (e.g. health surveillance)	o Deep analytics capabilities o Standards; protocols; interoperability	o Better predictive models o Better display models o Simulations -- both real time & exercise mode	

Public Education Oriented Activities

Shared: Hybrid of Education and Operations

Operations Oriented Activities

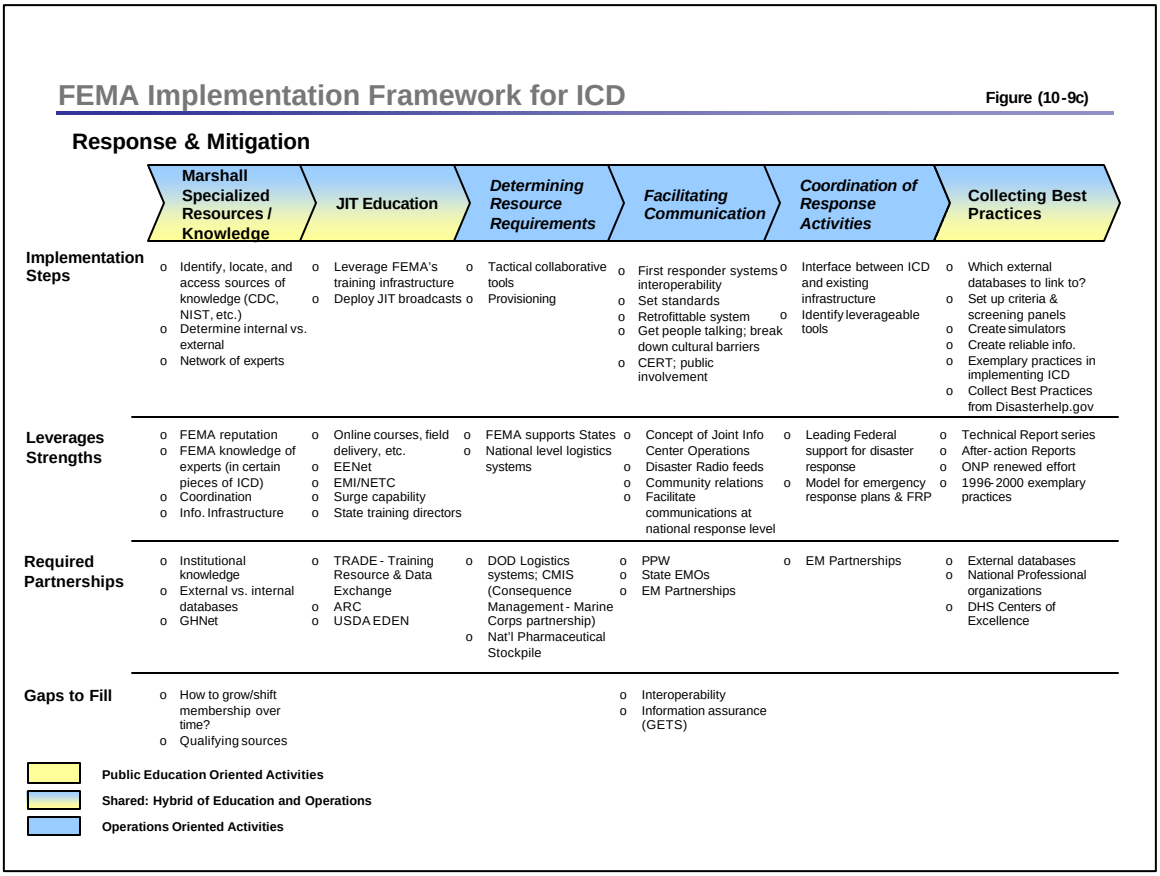


Figure 10-10 summarizes conclusions from the workshop, focusing on two main points: (1) FEMA/DHS may be the "natural owner" for ICD implementation, and would add value at multiple steps; (2) Partnership with ARC -- at least in Neighborhood Network Building and the Public Portal, and potentially in the Mitigation Operations Center as well -- could complement FEMA strengths, adding both valuable skills and public credibility.

Strong DHS/FEMA fit across the full ICD Value Chain … partnerships can help bolster capabilities and credibility

Figure (10-10)

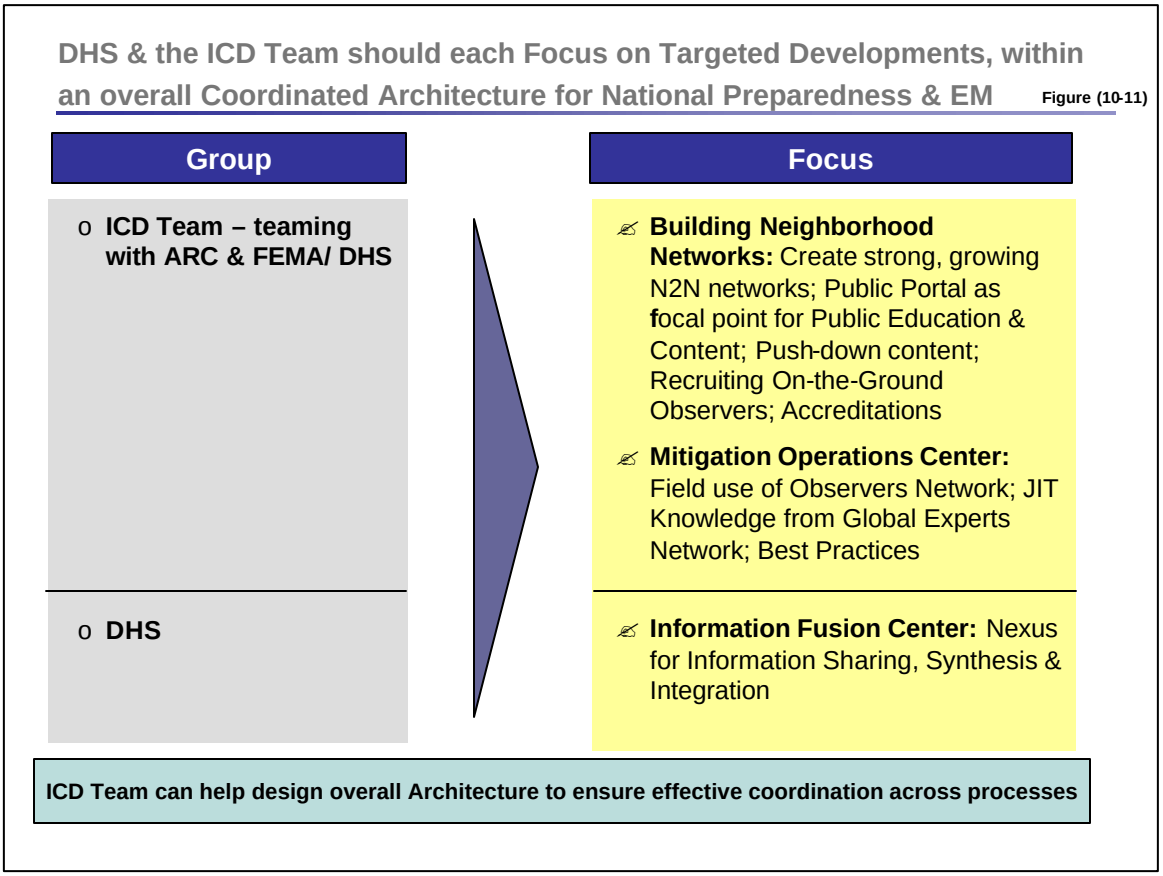
DHS/FEMA could be highly effective in leading overall ICD Implementation:

- Broad-based contributions across ICD Value Chain validate attractiveness of DHS/FEMA as institutional host for ICD
- Consistent with recommendations of Markle Taskforce on how to stimulate information sharing & integration, with key role for DHS
- ARC Partnership would boost public credibility and strengthen public education capacity; plus provide access to ARC volunteer network
- ARC may also be valuable partner for Mitigation Operations Center
- Neighborhood Watch and Citizen Corps need to be full partners to ensure network growth to 5M+ "eyes" focus on mitigation and on overall vigilance
- Other key players may include: HHS, DOJ, NOAA,Forest Service; others to be identified

Overall Conclusions for ICD Implementation

The various ICD Implementation Workshops, plus subsequent discussions with ARC and FEMA, suggest a powerful division of labor, plus two leading models for ICD Implementation at a National level.

Figure 10-11summarizes the conclusion that the ICD team, including FEMA and ARC, should concentrate efforts on developing the overall ICD Architecture, then leading in the set-up and operation of Neighborhood Network Building and the Mitigation Operations Center. The Information Fusion Center should be the primary province of DHS, cooperating with other government agencies, and including the appropriate linkages to the MOC and ICD Public Portal.



The reason for this proposed division of labor lies in the core competences and roles of each group (Figure 10-12). For example, the activities of the IFC – to serve as a nexus for information sharing, analysis, synthesis and integration – fall 100% within the proposed mission of the Information Analysis and Infrastructure Protection branch of IFC as summarized in the quote from the President's June, 2002 organization report describing DHS. Similarly, the Neighborhood Network Building and MOC activities play to key strengths of ARC and FEMA, plus the GHNet Team, with key overlaps with DHS Emergency Preparedness and Response and related response activities.

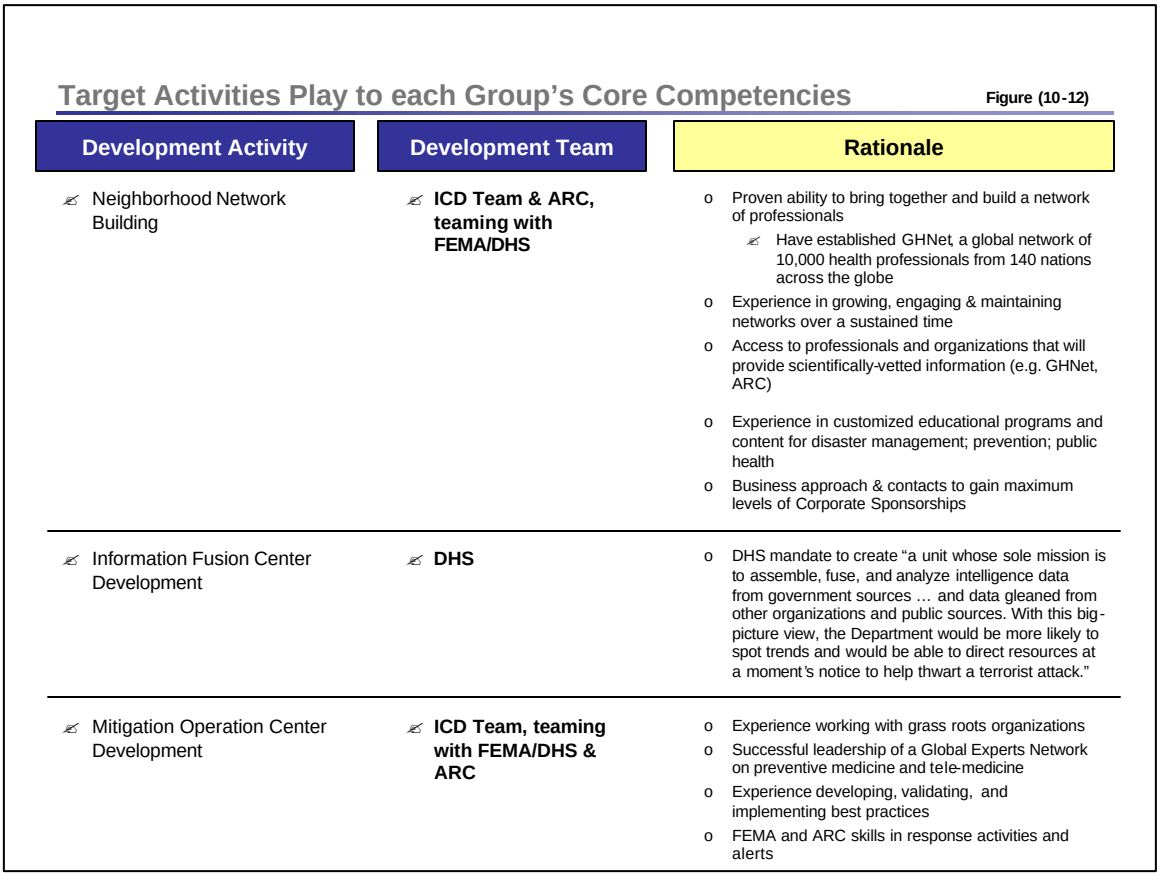
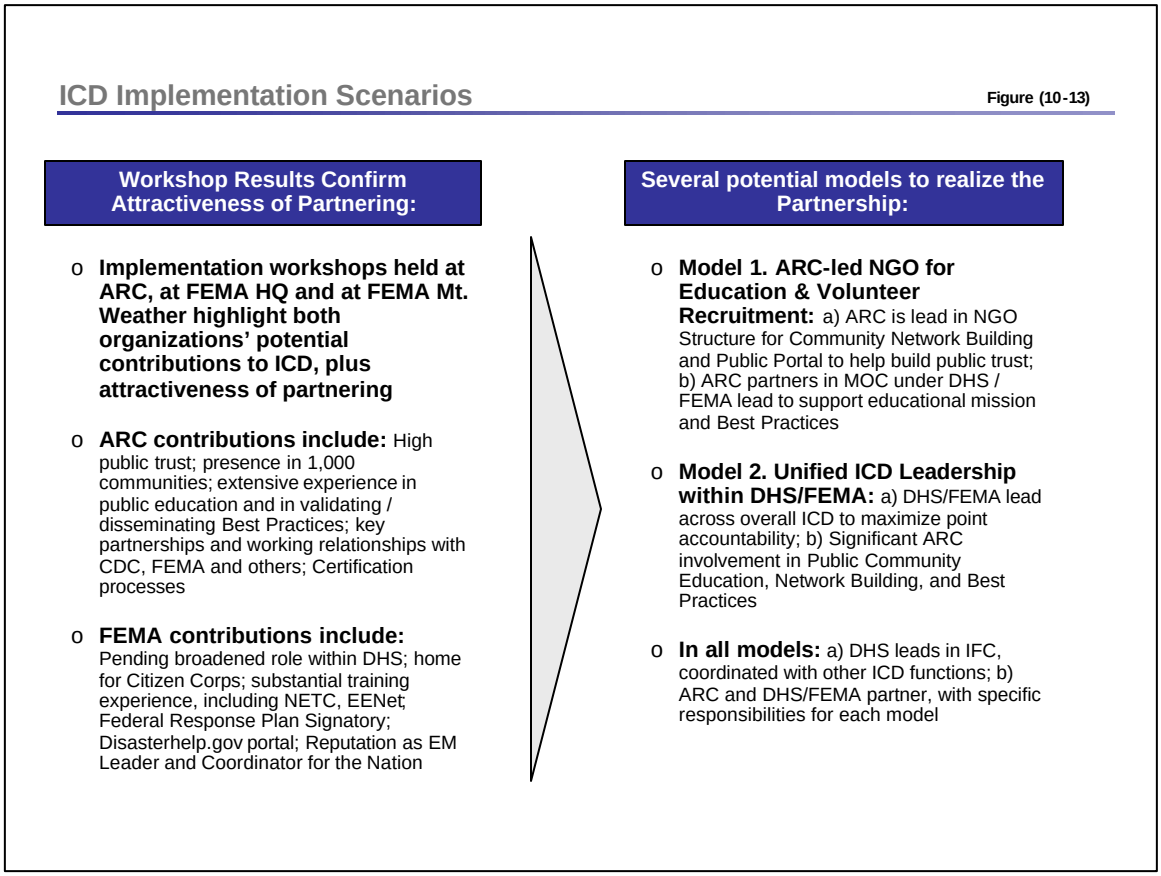


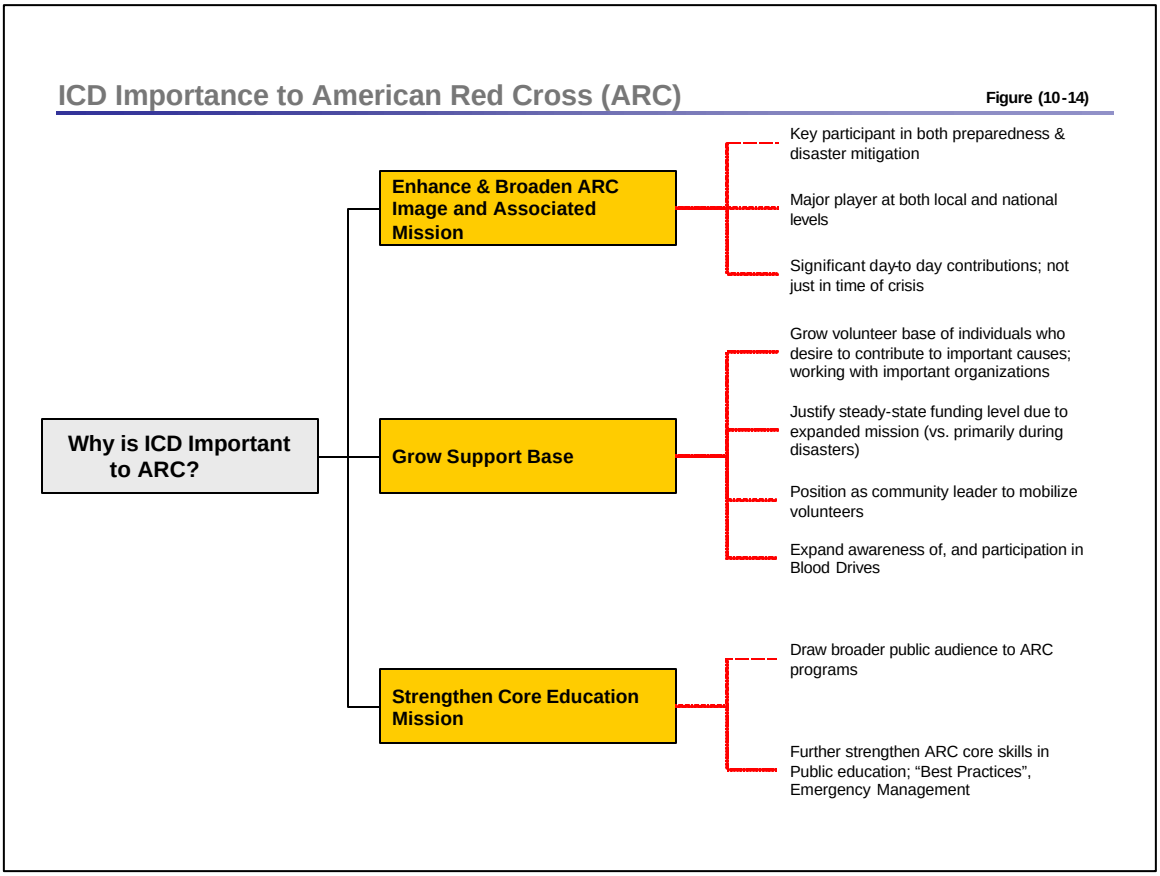
Figure 10-13 summarizes the overall conclusions that ARC and FEMA/DHS should partner to implement ICD, building on and leveraging the respective strengths and skills of the two organizations. There are two lead models for Implementation, with numerous "variations on a theme" connecting them:

- **Model 1: ARC-led NGO for Education & Volunteer Recruitment** has ARC leading an NGO structure for Neighborhood Network Building and the associated Public Portal, with FEMA/DHS partnership. ARC also partners in the MOC under DHS/FEMA lead to inject its experience in response operations and Best Practices. The rationale for this model is to maximize public credibility and trust in ICD by creating a highly-visible, non-governmental entity that oversees public education and information and volunteer activities.
- **Model 2: Unified ICD Leadership within DHS/FEMA** has DHS/FEMA leading in all phases of ICD to maximize point accountability for operations, with significant ARC participation in Network Building, Public Education, Certification/Accreditation processes, and Mitigation Best Practices. The primary rationale for Model 2 is to simplify the ICD structure under a single overall leadership team, while capturing the major benefits of partnering with ARC.
- **In both models**, the IFC would be the domain of DHS/FEMA; and ARC and DHS/FEMA partner with specific responsibilities for each model.



At this point, we believe that both models for ICD Implementation are feasible and attractive; subsequent discussions between the respective organizations will determine the most desirable implementation route.

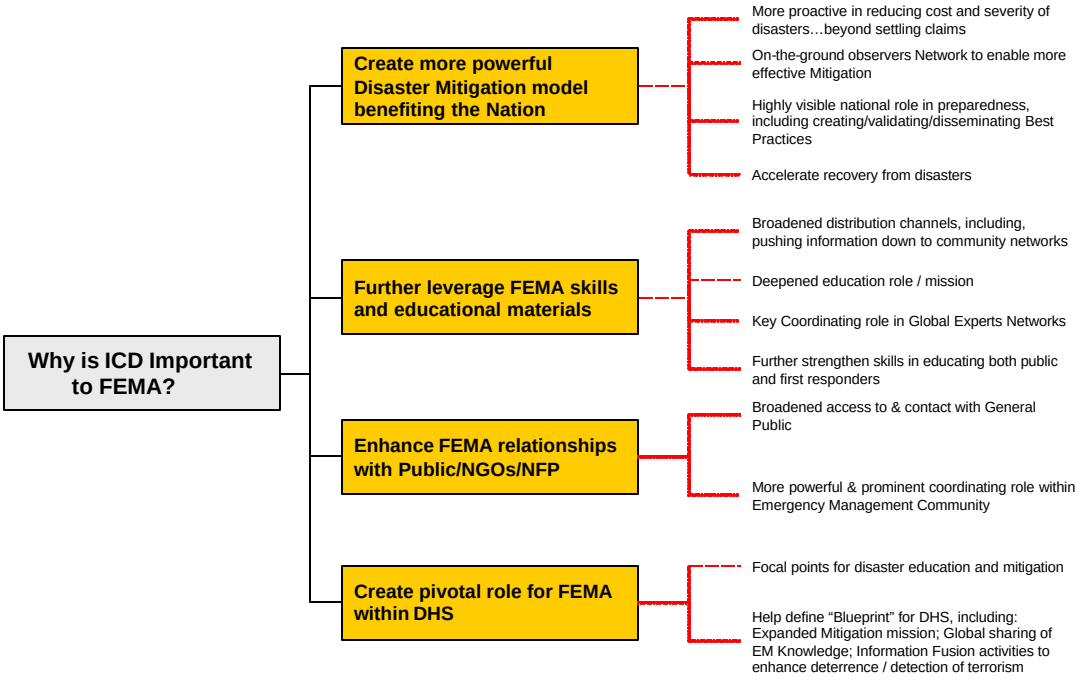
In addition to contributing to ICD implementation, we believe that partnering in ICD can materially advance the interests and national impact of both ARC and FEMA. For example, Figure 10-14 highlights benefits to ARC. High-level benefit categories include: Enhancing & Broadening the ARC Mission and Public Image as a significant day-to-day contributor to both preparedness and disaster mitigation; Growing the Support Base -- including volunteers, funding, and blood donations; and Strengthened Core Education Mission.



Similarly, Figure 10-15 highlights major benefits to FEMA, including: Creating a More Powerful Disaster Mitigation model that will benefit U.S. response capability; Further leveraging and deepening FEMA Educational Skills; Enhancing FEMA role as an overall coordinator within the Emergency Management community; and Creating a Pivotal Role for FEMA within DHS. In this vein, FEMA's key role in crafting the ICD business plan will have launched key elements of a blueprint for DHS to exert multiple positive impacts on public education, national preparedness, information sharing & synthesis, enhanced mitigation effectiveness, and societal resilience.

ICD Importance to FEMA

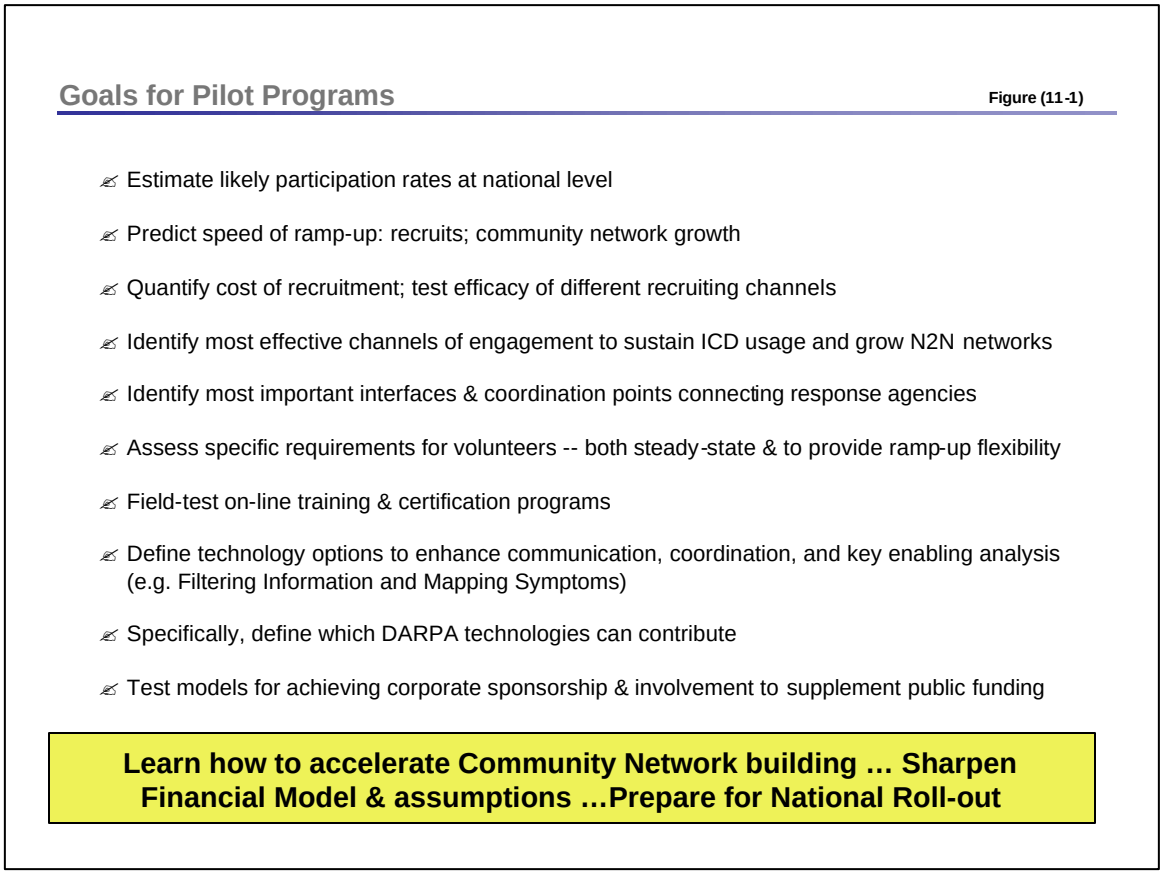
Figure (10-15)



XI. Pilot Projects and Considerations Surrounding National Roll-out

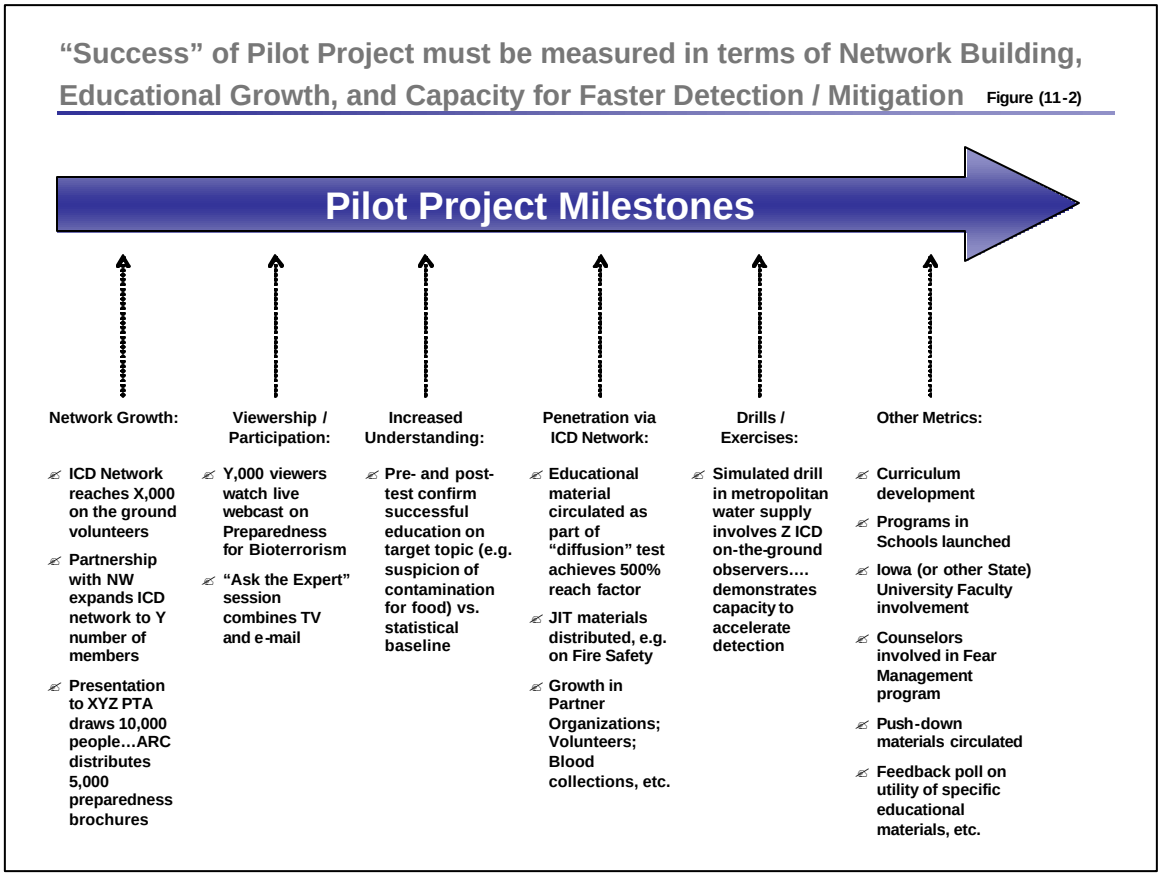
Pilot Project Objectives

Pilot Projects would have a number of objectives, summarized in Figure 11-1. Fundamentally, Pilots would help to measure speed of build-up of community networks and cost of recruitment; and would help to "field test" and validate the Public Portal operation; attractiveness of different forms of content – thereby, helping to sharpen public engagement strategies; on-line certification programs; and joint public/private financing models.



From a customer-oriented perspective, Pilot Programs would launch important programs of community preparedness and safety. At some point, ICD would begin to be tested in real crisis situations. But even before that, ICD performance could be measured against a variety of milestones that would provide important metrics of progress toward becoming a prepared community (Figure 11-2). For example, growth in the On-the-Ground Volunteer network would be a significant indicator of readiness and capacity for timely mitigation response. High levels of viewership of ICD content, including live webcasts, would indicate a better educated, more prepared citizenry. Educational effectiveness can be measured fairly rigorously by providing on-line "pre-tests" and "post-test" before and

after a key educational module – such as detecting contaminants in food – to measure actual growth in knowledge of specific areas. ICD Penetration can be measured through growth in partner organization volunteer bases or blood collections; plus "diffusion" of specific materials – such as fire safety education – that reach beyond the starting ICD audience through sharing of materials by current ICD users, thereby expanding the effective reach of the network. Simulated drills – for example, to measure rapidity of response to simulated contamination of local water supplies in multiple sources -- could show how well the ICD volunteers contribute to effective detection and mitigation. Other measures include school educational programs launched and user feedback polls. We believe that delivering measurable benefits to Pilot Cities/States should position those sites as leading-edge roles models for local-level emergency preparedness & response.



Ranking Pilot Project Sites

The best Pilot Project sites will have a variety of characteristics summarized in Figure 11-3. For example, attractive Pilot sites will be of manageable size, but definitely large enough for ICD to contribute to mitigating a variety of crisis situations. Probably a population of 400,000 up to 1.5M is optimal. The best Pilot sites should have active programs for integrating first responders and community organizations – and should be experimenting with innovative approaches and educational materials to enhance preparedness and mitigation capacity. ARC volunteer base should be significant relative

to population size. Most important, local officials should be interested in becoming models for emerging best practices in emergency management – including willingness to invest the time and effort to publicize and energize the ICD program and help create conditions conducive for success.

ICD Pilot Programs will Require key Attributes to foster Success

Figure (11-3)

City / Population Characteristics

1) Manageable Population Size - the city must be large enough to be able to simulate different response scenarios; but small enough to have well-defined linkages among response agencies; ideally, 400K - 1.5M people
2) Technology Savvy - an "Internet Ready" population enables ready implementation of ICD programs
3) Strong interest of local government & institutions: Explicit coordination efforts already underway between different CD constituencies; innovative programs for response and/or community involvement

Active Presence of Partner Network-building Organizations

1) Developed Neighborhood Watch System - city must have some sort of established system of neighborhood watch / "citizens network" in place for ICD to leverage for initial recruitment
2) Strong presence of other partner organizations: Block Parent, Citizen Corps, ARC, NEMA (or other professional organizations), etc.

Infrastructure Characteristics

1) Accessibility of Pilot Program Site - ICD must be able to easily establish a "command center" for the duration of Pilot Program with good accessibility to overall geography
2) Ready connectivity with First Responders -- ability of Mitigations Operations Center to communicate consistently with First Responders via Internet and/or available communication devices

ARC and / or FEMA presence

1) Strong ratio of ARC volunteers to total population to help prime network building
2) Commitment of Local Chapters - Local ARC / FEMA will have to be fully committed to ICD Pilot Program
3) Technology Availability - Local site must have access to technologies / capabilities that ICD will need to be successful, including: Call Center; Space and computers for Information Fusion Center
4) Volunteers for Call Center; plus skilled people (from FEMA or ARC) to staff Mitigation Operations Center
5) Strong ARC relationship with First Responders

Figure 11-4 presents a ranking template that can be used to evaluate candidates for Pilot Programs.

Pilot Program Self-Ranking Analysis

Figure (11-4)

Candidates for Pilot Programs: Please rank your capabilities for each of the categories listed below on a scale of 1 - 5 (5 = Best and 1 = Worst)

* 1	Manageable Population Size (400K - 1.5 Million People)	
2	Technology Savvy / "Internet Ready" Population	
3	Strong Interest of Local Government & Institutions	
4	Developed Neighborhood Watch System	
5	Strong Presence of Partner Organizations (E.G. Block Parent, Citizen Corps, NEMA and etc.)	
6	Accessibility of Pilot Program Site / Easy to Establish ICD Command Center	
7	Ready Connectivity with First Responders	
8	Strong Ratio of ARC Volunteers to Total Population	
9	Commitment of Local Chapter	
10	Technology Availability (E.G. Call Center, Computers, Network Equipment and etc.)	
11	Volunteers for Call Center	
12	Skilled Personnel from ARC and FEMA to Staff Mitigations Operations Center	
13	Strong ARC Relationship with First Responders	
	Average	

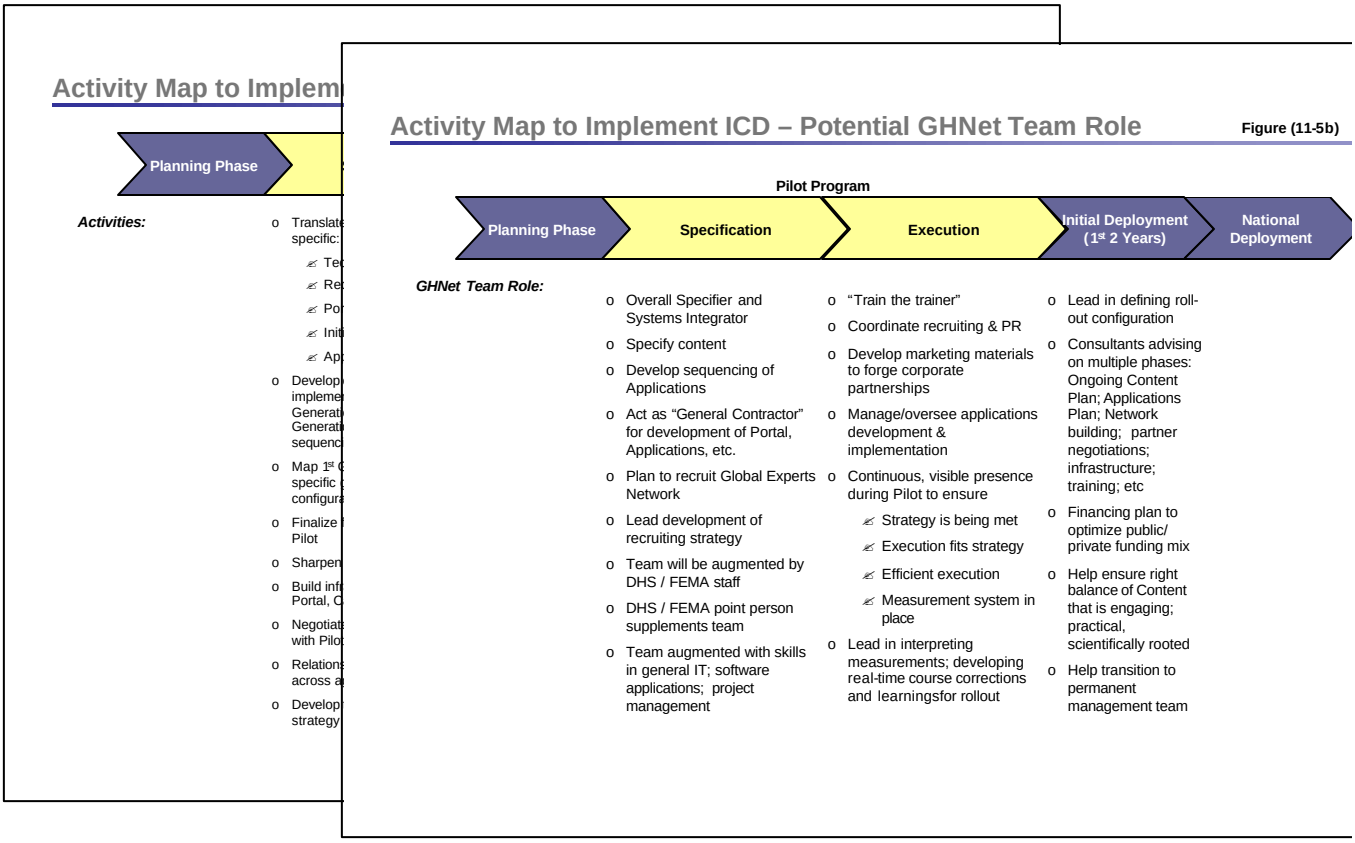
Note: * Score 5 for population size of 800K-1.5M, 4 for 400K -800K, 3 or lower if population size is significantly above or below 400K- 1.5M range.

The ICD team has begun discussions with Kansas City ARC and local government, and with Iowa State EMD in Des Moines. Attractive pilot candidates could include an "edge" city such as New Orleans, or "Heartland" cities such as Kansas City or Des Moines. The ICD Financial Plan estimates cost of Pilot Projects. For example, a six-month running Pilot program, with three months of preparation time prior to kick-off, should cost around $2.4-2.8M, depending on the level of in-kind contributions of people and infrastructure available from a Pilot City. If the Pilot can leverage the frameworks and hosting capability of the new FEMA portal, disasterhelp.gov, out-of-pocket costs could be further reduced. At this point, both Kansas City and Iowa offer strong ARC volunteer networks and support from the relevant CEOs; plus potential connection with active programs to improve emergency response activity.

Leading into National Roll-out of ICD

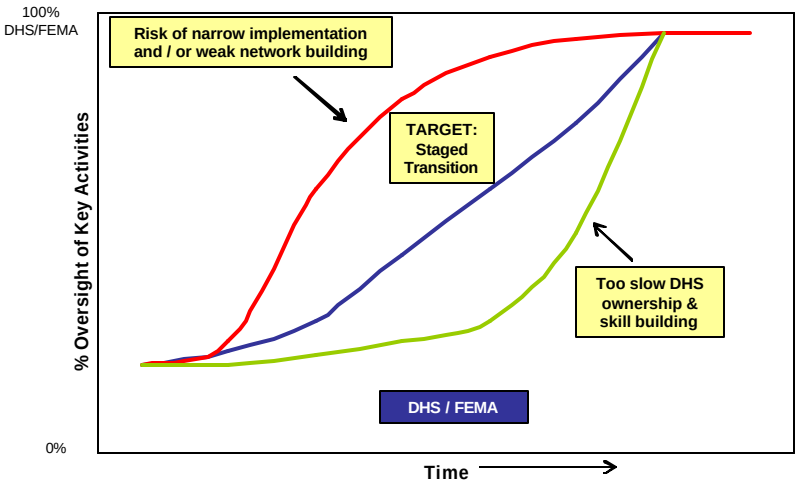
Pilot Projects are best viewed as the start of the launch stage for national roll-out, rather than as a discrete program in their own right. Pilot Programs will be valuable test-beds to sharpen a variety of ICD practices. But ultimately, Pilot Programs will be measured against the same "acid test" of performance as in full-scale implementations: Ability to contribute in measurable ways to public knowledge, preparedness, and mitigation speed and effectiveness.

Figures 11-5 and 11-6 summarize potential activities spanning ICD Pilot Programs – distinguishing Specification vs. Execution activities – through Initial Deployment.



A Deliberate Transition Plan is Needed for Successful DHS/FEMA Implementation and Ownership

Figure (11-6)



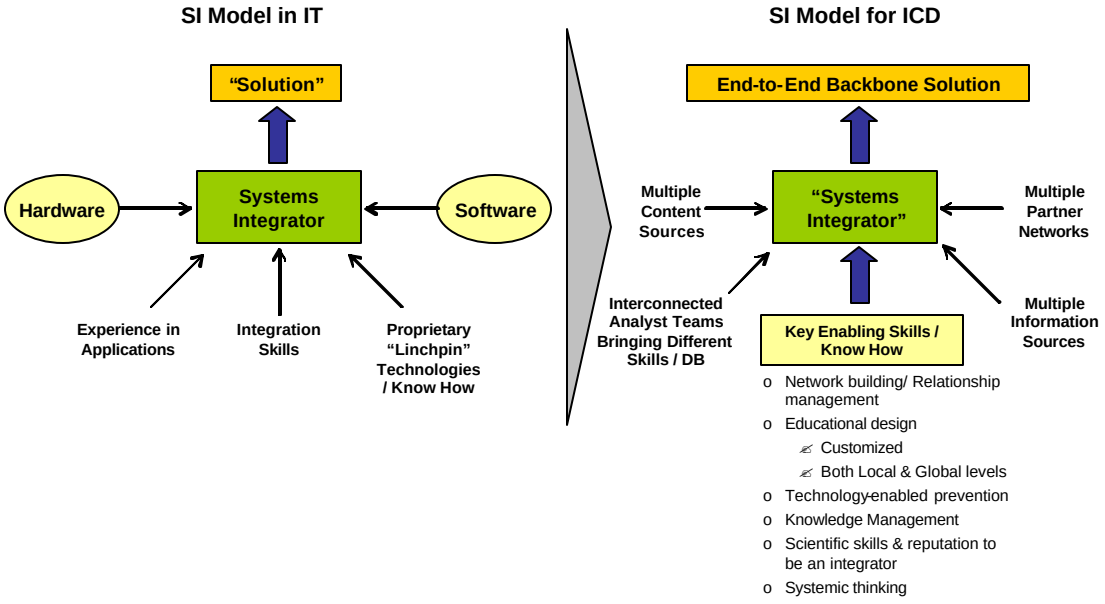
Building Strong Systems Integration Capabilities to Foster ICD Success

The ICD approach of creating an "end-to end solution" and a "backbone" for integrated Emergency Management System highlights a critical success factor for ICD launch and take-off. Namely, ICD will need to build and nurture a strong set of Systems Integration (SI) capabilities to take the best elements of the current EM system; build on them by adding "linchpin" activities – such as IFC and MOC; then "knitting" those all together into a high-performing system that can substantially boost national preparedness and response capability.

In the information technology world, an effective SI blends together hardware and software together with in-depth applications knowledge and some particularly high-value technologies (Figure 11-7). Similarly, ICD Systems Integration will involve accessing, then melding, multiple content sources, multiple partnerships (with ARC, NW, Citizen Corps, CDC, and others), multiple information sources, and activities of diverse, interconnected analyst teams across government agencies. High-value SI skills for ICD include: network building, relationship management, educational design, technology-enabled prevention, and combined scientific and systemic/strategic skills to be an effective integrator.

ICD brings a Systems Integrator (SI) approach to Emergency Management and National Preparedness

Figure (11-7)



Nurturing strong SI skills over time will help ICD adapt to and exploit new sources of content, need for new applications, shifting partner relationships, and new educational and communications challenges that will inevitably arise on the road to deployment. In turn, the integrated approach is one of the major sources of value that ICD brings to national Emergency Management.

Appendix 1: Selecting ICD Architecture

Selecting an ICD Architecture has involved identifying and weighing a variety of potential alternatives. Any architecture choice involves tradeoffs among performance attributes. For example, the chosen Architecture maximizes reliance on existing institutions, even at the cost of potentially-slower buildup of the national network, and multiple "handoffs" before data enter the Information Fusion Center. Figure A1-1 illustrates one alternative construct for ICD, in which all public calls are channeled through an ICD Call Center and e-mail Center to appropriate investigative authorities. Because all information is captured up front, it is automatically fed into the Information Fusion Center.

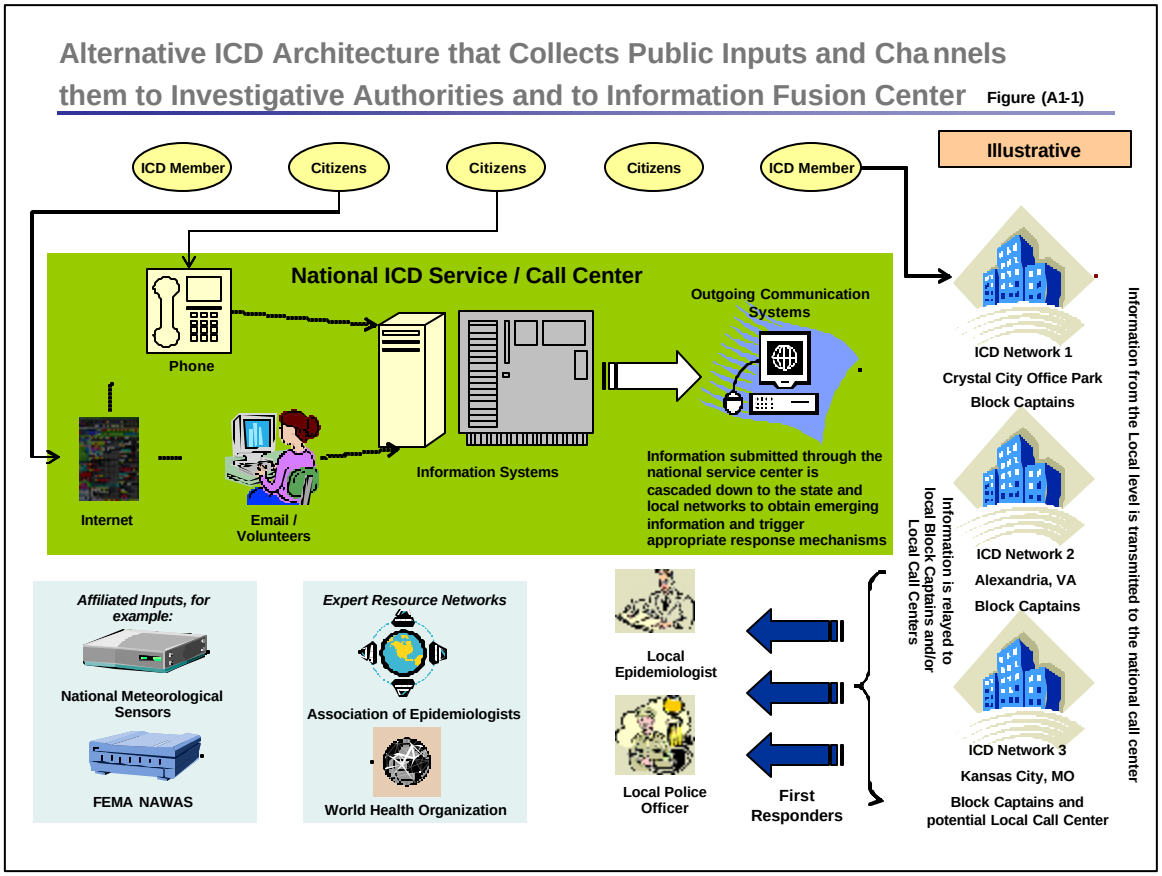


Figure A1-2 weighs advantages and disadvantages of the chosen architecture vs. this alternative. On balance, the chosen architecture wins out because of greater clarity of roles; and less complexity and potential for confusion by continuing to build on currently-employed channels for incident reporting and issue escalation. Other advantages include: Simplified partnership interfaces by working through existing community-based organizations; and separation of the education mission of the ICD Public Portal from any information collection activity from the public. On the other hand, partnership models for network building are inherently more complex to execute, so total

network growth will be slowed somewhat; and clear "rules" or protocols will be required to ensure information sharing through the IFC.

Selecting ICD Architecture involves tradeoffs between Rapid Network Building vs. Reliance on Existing Institutions: +/- of Chosen Architecture

Figure (A1-2)

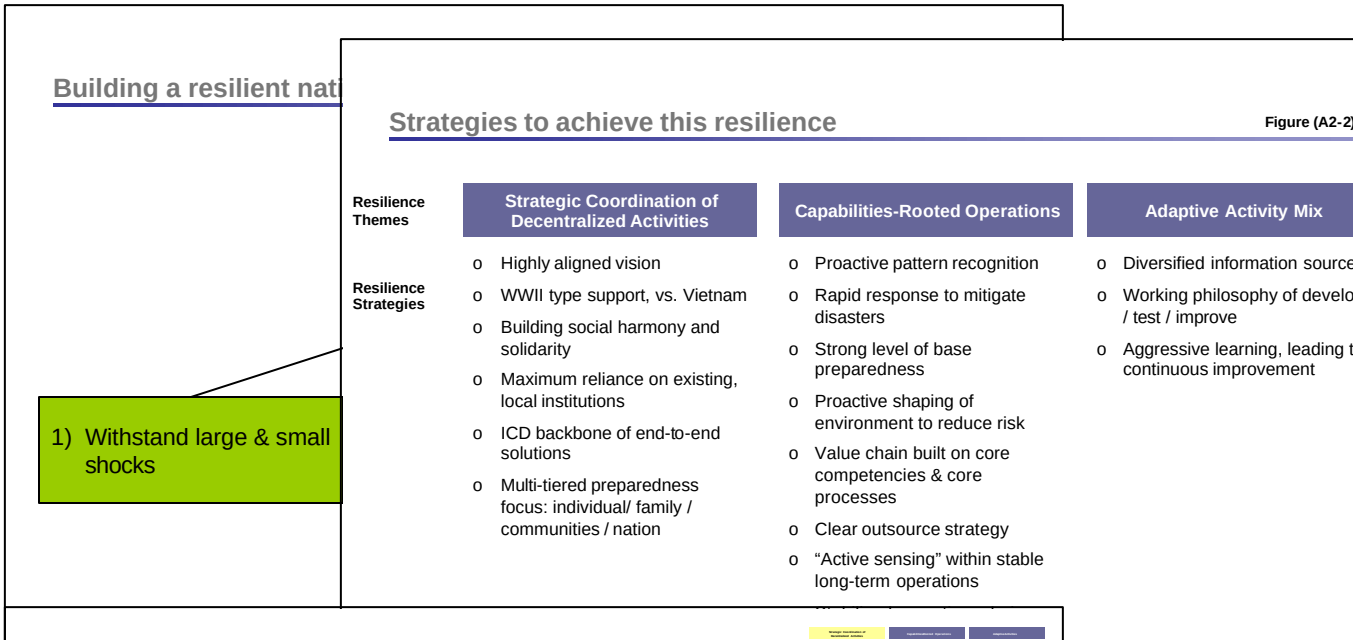
Advantages	Disadvantages / Risks	Required Actions
o Respects / leverages existing systems, organizations, networks o Build on current public knowledge of whom to contact o Minimizes overlap and complexity in up-front information capture and channeling to local authorities o Avoid complexity / slow-down in handling non-intended calls (e.g. 911 for house fire) o Leverages defined procedures for follow-up and issue escalation o Enables compelling mission for Citizen Corps to build Public Preparedness Network	o Mitigation effectiveness limited by gaps in existing networks (e.g. in office buildings) o More hand offs and attendant risk of information leakage (e.g. public to NW to Local Police to State Police to FBI) o Slower build-up of the public network of "eyes"; more reliant on multiple existing organizations…less PR and promotion potential o Risk that information sharing / integration is delayed or doesn't occur	✍ Use ICD and "National Preparedness" themes to proactively build public network … strengthen & leverage NW and Citizen Corps ✍ Create disciplined rules for information sharing ✍ Institutionalize Information Fusion activity…provide strong leadership ✍ Leverage DHS as "natural umbrella" for ICD

Performance themes: Build national preparedness…Efficient, impact-oriented information sharing, leading to Knowledge Management and Information Integration

Working sessions with ARC and with FEMA led to the definition of key choice criteria, and eventual selection of a target architecture for ICD implementation, as described in Sections I and IV-VI of this report.

Appendix 2: Building a Resilient National Preparedness System

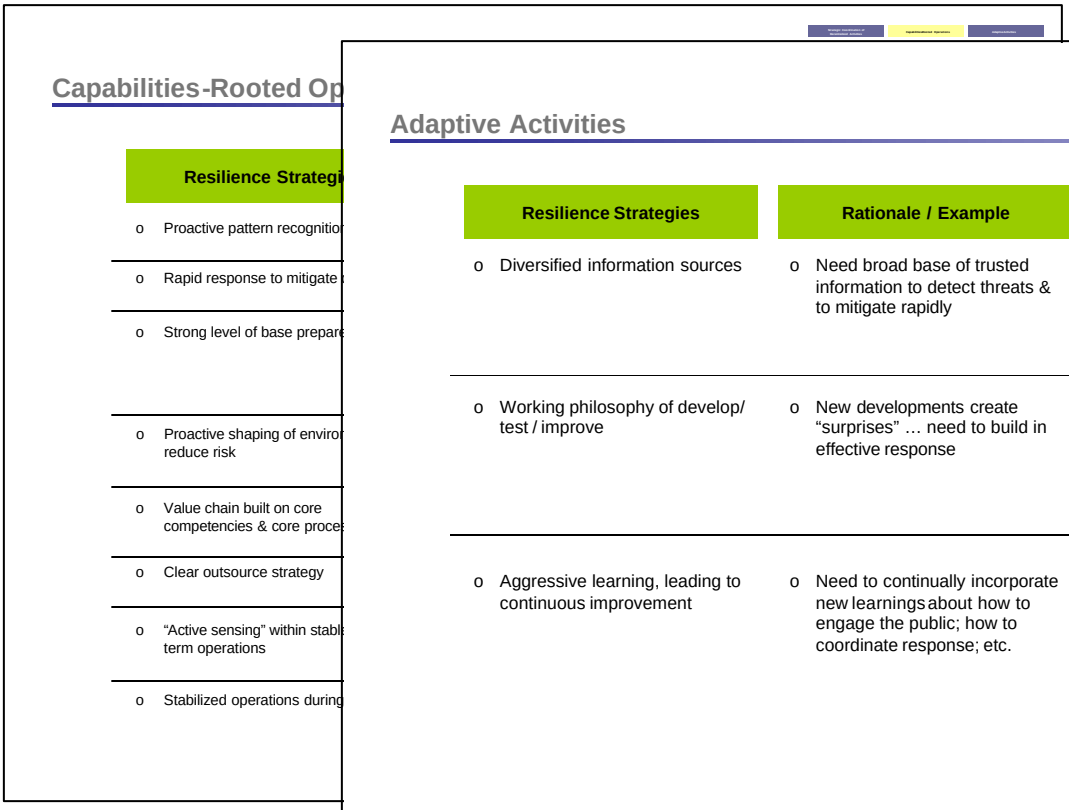
A key objective of ICD is to help create a more resilient National Preparedness system, one that is able to withstand and recover quickly from potential threats and actual emergencies. The objective of creating a resilient system is analogous to strategic planning work in the business world to create more "flexible," "agile," or "robust" strategies. Achieving Resilience is important because all impinging events cannot be predicted or detected ahead of time – albeit the detection and response delays can be shortened appreciably; hence, highly effective response, adaptation and shaping mechanisms are key needs of any economic and social system. Resilience is a multi-faceted objective, with many contributing factors. The following presentation lays out why resilience is a desirable attribute; then presents a framework to understand strategies and actions that contribute to resilience, plus how ICD helps foster these outcomes.



Strategic Coordination of Decentralized Activities

Figure (A2-3)

Resilience Strategies	Rationale / Example	Implementation in ICD
o Highly aligned vision	o Broad public perceives criticality of mitigating, and ultimately, preventing terrorism and natural disasters	o Expert content to reinforce key messages: Mitigation; preparedness; fear management; prevention
o WWII type support, vs. Vietnam	o Create grass roots support, building of common vision	o Clearly communicate latent national threat; continuous reinforcement, vs. "program of the day" o Start preparedness in the Schools
o Build social harmony and solidarity	o Create broad commitment to community well being	o Building strong social networks, within and across communities o Internet helps bridge distance in communications
o Maximum reliance on existing, local institutions	o Linkages with local officials are preserved & strengthened	o Public reports observations through existing channels; ICD adds value through integration
o ICD backbone of end-to-end solutions	o Coordinated solution to avert bottlenecks & boost total effectiveness	o Simultaneously raises: Public engagement; capacity to respond; technology to discern trends & patterns
o Multi-tiered preparedness focus: individual/ family / communities / nation	o Education strategies to prepare families under their control; complemented by higher-level strategies to foster preparedness	o Family-level education complemented by integration of observations from individual & multiple community networks


Capabilities-Rooted Op
Resilience Strategi
o Proactive pattern recognitio
o Rapid response to mitigate
o Strong level of base prepare
o Proactive shaping of enviro
reduce risk
o Value chain built on core
competencies & core proce
o Clear outsource strategy
o "Active sensing" within stabl
term operations
o Stabilized operations during
Adaptive Activities
Figure (A2-5)
Resilience Strategies
Rationale / Example
Implementation in ICD
o Diversified information sources
o Need broad base of trusted information to detect threats & to mitigate rapidly
o Information Fusion Center combines diverse inputs from expanded public networks cascading up through investigative channels
o Working philosophy of develop/ test / improve
o New developments create "surprises" … need to build in effective response
o New technologies layered in over time; ICD pilot programs will hone processes & measures and help arrive at most effective public engagement approaches
o Aggressive learning, leading to continuous improvement
o Need to continually incorporate new learnings about how to engage the public; how to coordinate response; etc.
o Specific "Best Practices" responsibility to collect, codify and disseminate exemplary practices that actually deliver results